CONSEIL PERMANENT INTERNATIONAL POUR
L'EXPLORATION DE LA MER
CHARLOTTENLUND SLOT. — DANEMARK

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(1939—1942)

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COPENHAGUE — IMPRIMERIE BIANCO LUNO A/S

REPORT

of

ADMINISTRATION 1939—40.

I. General.

Composition of the International Council or the Exploration of the Sea.

In course of the year 1939—40 no change in the composition of the Council has been announced by any of the Governments adhering to the work of the Council, and the number of adhering countries thus remains fifteen at the end of the financial year 1939—40. As far as Spain is concerned, however, no definite reply has been received from the new Spanish Government, who writes that the reorganisation of the Fishery Department has not yet been completed, but that a final answer may be expected during the summer of 1940. An approach to the Portuguese Government unfortunately has not had any positive result, and the present situation, therefore, is that the Portuguese Government will withdraw from the Council by the 21st of July 1941.

During the year the Council has suffered the loss of the Polish Delegate, Professor MICHEL SIEDLECKI, who had been connected with the work of the Council since the Polish Government became a member of the Council in 1925.

The only change of Delegates announced during 1939—40 is the appointment by the Finnish Government of Dr. E. PALMÉN *in lieu* of Dr. G. GRANQVIST.

Composition of the Bureau.

At the Council Meeting in May 1939 the Bureau, consisting of Professor JOHAN HJORT, Norway, President; M. THÉODORE TISSIER, France, Dr. C. HEINRICI, Germany, Professor MARTIN KNUDSEN, Denmark, and Mr. A. T. A. DOBSON, England, Vice-Presidents, was re-elected. In addition Professor OTTO PETTERSSON and Mr. HENRY G. MAURICE remain Honorary Presidents of the Council with the right of attending all meetings of the Council as well as the Bureau.

Committees.

The list of Committees presented in the Rapp. et Proc.-Verb., Vol. No. 109, Part I, records the number of Committees and the names of members appointed at the last sitting of the Council in Berlin 1939. No change of chairmanship or membership has been made since then with the exception that the loss of the late Professor SIEDLECKI leaves the Salmon and Trout Committee without a chairman.

Audit of Accounts.

The accounts for the year 1938—1939, published in the Administrative Report of last year (Vol. No. 109, Part II, p. 4) have been audited by a qualified accountant and inspected by the Finance Committee, and will be submitted to the Council when next sitting. One of the members, however, the Delegate for Holland, Mr. VAN RIEL, has not as yet had an opportunity of inspecting the accounts due to the postal difficulties at present. Mr. VAN RIEL has kindly consented to await inspection of the accounts until normal conditions again exist in Europe.

A statement of accounts for the year 1939—1940 is given overleaf; it has this year been possible to have the accounts audited by the usual accountant before presenting them to the Delegates.

Income and Expenditure Account for the year ending March 31st 1940.

EXPENDITURE

		Estimates	Expenditure	
I. Incidentals				
1	President	*15,000.00*	6,000.00	
2	Hydrogr. Consultant		3,000.00	
3	Editor of Statistics		2,000.00	
4	Editor of Journal		3,750.00	
				14,750.00
II. Headquarter Staff				
5	Adm. Secretary	*15,000.00*	12,000.00	
6	Hydrographer		3,000.00	
				15,000.00
	Clerical Staff			
7	1st Asst. Secretary	*27,500.00*	6,000.00	
8	2nd — —		5,000.00	
9	Statistical —		4,800.00	
10	Secretarial Assistant		2,700.00	
11	Hydrograph. Secretary		2,375.00	
12	Clerical Assistance		5,575.00	
				26,450.00
III. Office Expenses				
13a	Rent	*16,000.00*	5,580.00	
b	Heating		1,238.76	
c	Stationery, Books, etc.		3,758.14	
d	Teleph., Telegr., Postage		1,392.33	
e	Furniture and Fittings		215.00	
f	Insurance		484.96	
g	Upkeep, Cleaning, Rep.		1,806.16	
h	Miscellaneous		1,048.37	
				15,523.72
14	**IV. Travelling Expenses**	*14,000.00*		3,845.34
15	**V. Chairmen of Committees**	*31,000.00*		29,003.71
16	**VI. Printing and Distribution**	*41,000.00*		31,060.10
	Ordinary Expenditure	*159,500.00*		135,632.87
	VII. Extraordinary Expenditure			
17	Mr. SANDSTRÖM's work: Balance of Council's Contribution	*2,423.88*	2,423.88	
18	Material for Standardization of Photocells	*218.83*	0	
19	Expenses in connexion with Council Meeting in Berlin (incl. travelling tec.)	*4,000.00*	4,831.33	
				7,255.21
	VIII. Pension Fund			
20	Transferred according to Standing Resolution	*3,500.00*	3,500.00	
21	Refund of Pension	*6,500.00*	6,500.00	
				10,000.00
	Total Expenditure	*176,142.71*		152,888.08
	Excess of Income over Expenditure			685,49
				Kr. 153,573.57

INCOME

		Estimates	Income	
I. Annual Contributions				
Germany	$^{10}/_{11}$ 1939	*20,000.00*	20,000.00	
Sweden	$^{25}/_{7}$ „	*10,000.00*	10,000.00	
Norway	$^{30}/_{9}$ „	*10,000.00*	10,000.00	
Denmark	$^{11}/_{10}$ „	*10,000.00*	10,000.00	
Iceland	$^{2}/_{3}$ 1940	*10,000.00*	10,000.00	
Eire	$^{30}/_{3}$ „	*5,000.00*	10,000.00	
Portugal	$^{27}/_{2}$ „	*5,000.00*	5,000.00	
Receipts as per March 31st, 1940				75,000.00
Outstanding as per March 31st, 1940:				
France		*20,000.00*		
Great Britain		*20,000.00*		
Belgium		*10,000.00* [2])		
Holland		*10,000.00*		
Finland		*5,000.00* [2])		
Latvia		*5,000.00*		
Outstanding as per April 1st, 1940				70,000.00
Further outstanding				
Spain		*20,000.00*		
Poland		*10,000.00*		0 [1])
II. Interests				
on Bank Deposits		*1,000.00*	601.40	
on Investments		*6,000.00*	6,000.00	6,601.40
III. Sale of Publications		*2,200.00*	1,972.17	1,972.17
		179,200.00		
Total Income				**Kr.** 153,573.57

[1]) Spain's and Poland's Contributions not included in Outstanding Contributions pending future decision.

[2]) Paid on May 5th and Jan. 6th, 1941, respectively.

(May, 1941, Adm. Secr.)

Statement of Pension Fund Accounts 1939—1940.

EXPENDITURE		INCOME	
Mrs. Drechsel's pension	6,500.00	Balance as per April 1st, 1939	62,545.60
Balance as per March 30th, 1940	69,143.76	Transferred from revenue	3,500.00
		Refund of pension paid	6,500.00
		Interests	3,098.16
	Kr. 75,643.76		Kr. 75,643.76

Balance Sheet, March 30th, 1940.

LIABILITIES			ASSETS		
Capital Reserve:			Cash at Handelsbanken	18,077.14	
Balance per April 1st, 1939	209,243.99		— - Ordrup-Charlottenlund Bank	1,789.12	
plus Excess of Income over ordinary Expenditure	17,940.70		— in hand	1,248.11	
	227,184.69				21,114.37
less Extraordinary Expenditure	17,255.21		Danish Treasury Bonds (nom. value Kr. 120,000; Market value on March, 29th, 1940, Kr. 105,300) at cost		118,543.43
		209,929.48			
			Pension Fund:		
Pension Fund		69,143.76	Cash at bankers	4,240.84	
Total Funds		279,073.24	Danish Treasury Bonds (nom. value 66,000; Market value on March 29th, 1940, Kr. 58,496.25) at cost	64,902.92	
					69,143.76
Sundry Creditors as per March 30th, 1940		18.57	Sundry Debtors (less Spain and Poland) as per March 30th, 1940		70,290.25
		Kr. 279,091.81			Kr. 279,091.81

The statement gives rise to the following remarks:—

None of the items under Ordinary Expenditure (I—VI) have exceeded the Estimate for the year; some of them show a considerable lower expenditure, thus Travelling Expenses does not reach Kr. 4,000 versus the estimated Kr. 14,000; this is due to the fact that two meetings have been postponed and that it has not been possible to have a Bureau Meeting this winter. Item V, Chairmen of Committees, shows a saving of about Kr. 2,000 due to the return of the quarterly honoraria for January 1940 by the Chairman of the Consultative Committee and the Chairman of the Northern North Sea Committee, and the saving of honorarium as Vice-chairman of the Atlantic Slope Committee, as no appointment has been made since the last Council Meeting. Item VI, Printing and Distribution also shows a saving of some Kr. 10,000 mainly due to the non-publication of the Bulletin Hydrographique for the year 1938. Thus the Ordinary Expenditure shows a total of Kr. 135,632.87 as against an Estimate of Kr. 159,500.00.

In respect of Extraordinary Expenditure it may be mentioned that the balance of the amount due to Mr. Sandström has been paid in full. The expenses in connexion with the Council Meeting in Berlin, including travelling, exceeded the Estimates by Kr. 831; the total Extraordinary Expenditure after carrying the usual Kr. 3,500 to the Pension Funds amounts to Kr. 17,255.21 and the Total Expenditure of the year thus reaches Kr. 152,888.08 as against an Estimate of Kr. 176,142.71.

As far as Income is concerned the contributions are estimated at Kr. 170,000; out of these Kr. 75,000 had been received by the end of the financial year on March the 30th. Under receipts Kr. 70,000 have been taken up as outstanding, while at the advice of the auditors the contributions of Spain and Poland, totalling Kr. 30,000 should not be accepted as debts likely to be liquidated in the nearest future. — Thus the Income for the year is inserted as Kr. 145,000 or Kr. 5,000 more than estimated last year, because the Government of Êire has increased last year's contribution to the statutory Kr. 10,000 *in lieu* of Kr. 5,000 as before.

Item II: Interest, is about Kr. 400 below the Estimate due to the fact that contributions have been paid somewhat later than usual. Finally item III, Sale of Publications is just over Kr. 200 less than estimated, evidently due to the present international disturbances. The total Income thus reaches Kr. 153,573.57 which as against the total Expenditure shows an excess of Income over Expenditure by Kr. 685.49.

The Balance Sheet prepared opens with a Capital Reserve by April the 1st, 1939, of Kr. 209,243.99, the saving on last year's budget has increased this

Capital to Kr. 209,929.48 by March 31st, 1940, which added to the Pension Funds, Kr. 69,143.76, shows total funds amounting to Kr. 279,073.24 as against Kr. 271,789.59 last year excluding Kr. 10,000 for the past year from Poland and excluding also any contribution from the Spanish Government, the question of which is still awaiting settlement for the financial years 1938—39 and 1939—40.

Meetings.

Meetings of the Bureau took place in May 1939 in Berlin; since then circumstances have prevented any further meeting of the Bureau. *In lieu* of a Bureau Meeting the President called a meeting in Copenhagen shortly after the outbreak of the war to consult the Senior Delegates of Denmark and Sweden as to steps to be taken in the immediate future. This meeting was held in Copenhagen on October the 9th and 10th, and a circular on the discussions was distributed to all Delegates and Chairmen of Committees.

In accordance with the decision of the Council (Rapp. et Proc.-Verb., Vol. No. 109, Part I, p. 36) a meeting of experts on the Faxa Bay question was held in Reykjavik on July the 23rd—27th, 1939. At the Council Meeting in May 1939 recommendations were adopted also for meetings to be held at Biarritz (Sardine Experts) and at Helsingfors (Sprat Experts), both of these meetings have been cancelled due to circumstances.

II. Work in Copenhagen.

As specified in last year's Administrative Report the work at the Central Office in Copenhagen was divided into four separate departments: 1) Accounts and correspondence, 2) Publications and Library, 3) Hydrography and 4) Statistics. The work has been carried out according to ordinary routine and along the customary lines. A number of publications were being prepared and in hand when the war commenced in September last year, the publications have been finished as specified below and in accordance with the Estimates of last year. Two papers, however, have been postponed: 1) the Bulletin Hydrographique for the year 1938 and 2) Fiches Planctoniques. As regards the Bulletin Hydrographique all material received has been treated and prepared for publication, but with the approval of the Hydrographical Consultant the publication was postponed for the time being. As regards the Fiches Planctoniques, a new publication, manuscripts have been received for four such issues, they remain in proof and nothing has been done pending the developments to come. Non-issue of those two publications has caused the saving of some Kr. 10,000 on the Statement of Expenditure above. It should be mentioned, however, that a special section of the Bulletin Hydrographique: one containing the hydrographical observations from the expedition to the Atlantic in 1938, arranged by the "Committee on the Proposed International Survey of the Gulf Stream Area" under the "Association d'Océanographie Physique", is already so far advanced that this particular part can be published independently, the material is ready for printing and the cost so far incurred will be carried on to the current year's expenditure.

During the year the Hydrographical Department has concentrated on working up data from previous year's cruises within the Faroe-Shetland Channel, this material is rapidly developing.

The Statistical Department has continued checking the published figures of previous Bulletins Statistiques in accordance with the decision of the Statistical Committee last year.

The present inactivity at sea will cause a certain decrease in work for the staff of the Central Office, but in course of the years passed a certain number of things has had to be neglected and it has been suggested to the President that efforts be concentrated on carrying all arrears so far up to date that most matters possible are fully à jour when ordinary activities can recommence; what work to be done will be discussed at a meeting between the Senior Delegates of Denmark and Sweden to be held in Copenhagen during the month of April at the Central Office.

Report regarding Cost of Publications issued during the Financial Year 1939—1940.

Series	Volume	Pages	Subject	Estimated	Cost
Rapp. & Procès-Verbaux	CIX	280	Procès-Verbal, Rapport Administratif et Appendices...	*6,000.00*	8,683.09
—	CX	104	Report on Special Scientific Meeting.....	*2,500.00*	3,269.71
—	CXI	92	Rapport Atlantique	*2,000.00*	2,824.39
Bulletins		49	Bulletin Statistique, 1937.....	*3,500.00*	2,621.93
—			— Hydrographique, blocks	*7,000.00*	40.04
Journ. du Conseil	XIV, 1—3	454	.....	*9,000.00*	9,588.77
			Fiches Planctoniques.....	*2,500.00*	60.00
			Miscellaneous	*1,500.00*	620.00
			Total...	*34,000.00*	27,707.93
			Translations etc.....	*3,000.00*	689.00
			Distribution	*4,000.00*	2,663.17
			Grand Total...	*41,000.00*	31,060.10

REPORT

of

ADMINISTRATION 1940—41.

I. General.

Composition of the International Council for the Exploration of the Sea.

During the year 1940—41 no change has occurred in the composition of the International Council in respect of adhering countries. It should be recorded, however, that the current 5-year period of participation will expire on July 21st 1941, and that so far the present unrest in Europe has prevented any formal enquiries to be made to the participating Governments as to a renewal of participation for a further 5-year period. It may be confirmed, though, that the Government of Portugal two years ago announced their withdrawal as from July 22nd 1941, a decision that has not been altered since; as far as Spain is concerned an informal enquiry as to the possibility of participation at a reduced contribution it has not been possible to answer due to present difficulties.

As regards Delegates no change has been announced during the year; Spain has appointed M. Jésus Maria de Roderrotaeche, Chief Director of the Spanish Oceanographical Institute, a Delegate.

Composition of the Bureau.

On January the 17th the Président d'Honneur of the International Council, Professor Otto Pettersson, passed away, 93 years old.

The composition of the Bureau has not been subject to any change, now consisting of Prof. Johan Hjort, President, M. Théodore Tissier, Dr. C. Heinrici, Professor Martin Knudsen and Mr. A. T. A. Dobson, Vice-Presidents. Mr. Henry G. Maurice is Président d'Honneur with the right to attend the meetings of the Bureau.

Committees.

The Committees in being after the Berlin Meeting in May 1939 remain in being without any change in composition or membership during the past year. No chairman has been appointed in lieu of the late Professor M. Siedlecki, Chairman of the Salmon and Trout Committee.

The reports of the Committees for the year 1939 were compiled as usual last year and have all been received with the exception of that of the Baltic Committee; these reports exist in typescript and may be had—as announced last year—on request to the Administrative Secretary. For the year 1940 no reports have been received, and no special efforts have been made to compile any report as the development of the war was bound to curtail a general survey of work carried out during that year.

In accordance with the decision of the Council (Berlin 1939) all chairmen have been paid up to date wherever possible; a few honoraria have been reserved for payment when normal conditions in Europe again prevail.

Audit of Accounts.

The accounts of the Council for the years 1938/39, 1939/40 are still awaiting the acceptance of the Council; those for 1940/41 are presented overleaf, duly audited by our Chartered Accountants as usual.

No estimate could be passed last year and the President then decided to follow his authorization by the Council in 1939 (See Rapp. et Proc.-Verb., Vol. No. 109, p. 17—18): To continue the estimate for 1939/40 until the Council could meet again.

Income and Expenditure Account for the year ending March 31st 1941.

EXPENDITURE

		Estimates 1939—40	Expenses 1940—41	
	I. Incidentals			
1	President	*15,000.00*	6,000.00	
2	Hydrogr. Consultant		3,000.00	
3	Editor of Statistics		2,000.00	
4	Editor of the Journal		3,000.00	
				14,000.00
	II. Headquarter Staff			
5	Adm. Secretary	*12,000.00*	12,000.00	
6	Hydrographer	*3,000.00*	3,000.00	
				15,000.00
	Clerical Staff			
7	1st Asst. Secretary	*27,500.00*	6,000.00	
8	2nd — —		5,000.00	
9	Statistical —		4,800.00	
10	Secretarial Assistant		2,700.00	
11	Hydrograph. Secretary		3,000.00	
12	Clerical Assistance		5,100.00	
				26,600.00
	III. Office Expenses			
13a	Rent	*16,000.00*	5,580.00	
b	Heating and Light		1,081.76	
c	Stationery, Books, etc.		1,059.84	
d	Teleph., Telegr., Postage		760.32	
f	Insurance		405.10	
g	Upkeep, Cleaning, Rep.		1,965.94	
h	Miscellaneous		909.09	
				11,762.05
14	**IV. Travelling Expenses**	*14,000.00*		392.04
15	**V. Chairmen of Committees**	*31,000.00*		29,000.00
16	**VI. Printing and Distribution**			
	Minor expenses in connection with printing	*41,000.00*	1.13	
	Distribution		92.16	93.29
	Ordinary Expenditure	*159,500.00*		96,847.38
	VII. Extraordinary Expenditure			0
	VIII. Pension Fund			
20	Transferred according to standing resolution	*3,500.00*	3,500.00	
21	Refund of Pension	*6,500.00*	541.66	
				4,041.66
	Total Expenditure	*169,500.00*		100,889.04
	Excess of Income over Expenditure			50,413.36
				Kr. 151,302.40

INCOME

		Estimates 1939—40	Income 1940—41	
	I. Annual Contributions.			
	Sweden $^{19}/_{10}$ 1940	*10,000.00*	10,000.00	
	Denmark $^{11}/_{11}$ „	*10,000.00*	10,000.00	
	Norway $^{19}/_{3}$ 1941	*10,000.00*	10,000.00	
	Receipts as per March 31st, 1941			30,000.00
	Outstanding as per March 31st, 1941:			
	France	*20,000.00*		
	Germany	*20,000.00* [2]		
	Great Britain	*20,000.00*		
	Belgium	*10,000.00*		
	Eire	*10,000.00*		
	Holland	*10,000.00*		
	Iceland	*10,000.00*		
	Finland	*5,000.00*		
	Latvia	*5,000.00*		
	Portugal	*5,000.00*		
	Outstanding as per April 1st, 1941			115,000.00
	Further outstanding			
	Spain	*20,000.00*		
	Poland	*10,000.00*		0 [1]
	II. Interests			
	on Bank Deposits	*1,000.00*	631.73	
	on Investments	*6,000.00*	4,750.00	5,381.73
	III. Sale of Publications	*2,500.00*	920.67	920.67
		184,200.00		

[1]) Spain's and Poland's Contributions not included in Outstanding Contributions pending future decision.

Total Income... **Kr.** 151,302.40

Statement of Pension Fund Accounts 1940—1941.

EXPENDITURE		INCOME	
Mrs. Drechsel's pension	541.66	Balance as per April 1st, 1940	69,143.76
Balance as per March 31st, 1941	75,976.56	Transferred from Revenue	3,500.00
		Refund of pension paid	541.66
		Interests	3,332.80
	Kr. 76,518.22		Kr. 76,518.22

Balance Sheet, March 31st, 1941.

LIABILITIES			ASSETS		
Capital Reserve:			Cash at Handelsbanken	15,323.80	
Balance as per April 1st, 1940	209,929.48		— - Ordrup-Charlottenlund Bank	8,529.76	
plus Excess of Income over ordinary Expenditure	54,455.02		— in hand	1,036.92	
	264,384.50				24,890.48
less extraordinary Expenditure	4,041.66		Danish Treasury Bonds as per 1/4 1940 nom. value Kr. 120,000; at cost Kr. 118,543.43 during 1940/41 sold nom. value Kr. 50,000 at	49,250.70	
	260,342.84				
less loss on debtors 1939/40	13.00				
		260,329.84	Balance as per 31/3 1941, nom. value Kr. 70,000 (market value on 31/3 1941: Kr. 70,350) at cost		69,292.73
Pension Fund		75,976.56	Pension Fund:		
Total Funds		336,306.40	Cash at bankers	11.073.64	
			Danish Treasury Bonds, nom. value Kr. 66.000 (Market value on 31/3 1941: Kr. 65,693.75) at cost	64,902.92	
					75,976.56
			Debtors as per 31/3 1941:		
			Contributions from 1939/40	65,000.00	
			— - 1940/41	115,000.00	
Sundry Creditors as per 31/3 1941		14,018.57	Sundry Debtors	165.20	
					180,165.20
	Kr.	350,324.97		Kr.	350,324.97

Accordingly no change has been made as to payment of office-holders or staff and items 1—12 and 15, therefore, do not give rise to any special comment. Items 13 *a*, *b*, *d*, *f*, and *g* are more or less standard expenses subject to but slight changes, 13 *c* and *h* are kept as low as possible.—Travelling expenses are exceedingly low and cover a single visit only by the President to the Central Office.

Printing has not incurred any expenditure, all series being temporarily stopped at the beginning of 1940.

As to Extraordinary Expenditure, item 21, the pension to Madame Drechsel, expired at her death in April 1940.

As far as Income is concerned the contributions of all Governments except those of Spain and Poland have been included as customary.—Three countries only have paid their contribution for the year 1940/41, that of Germany has been announced, while but few of the others are to be expected until after the war. The outstanding contributions for the year thus amount to Kr. 115,000.00 by March 31st 1941; in addition Kr. 65,000.00 are as yet outstanding from the previous year—Finland only having paid.[2])

From the Statement of Accounts it will be noticed that the income exceeds the expenditure by Kr. 50,413.36.

Balance Sheet.

Carrying the excess of Income over Expenditure to the Capital Reserve at the beginning of the year the Capital shows a rise from some 210,000 Kr. to Kr. 260,329.84. When considering, however, that Kr. 180,000.00 of this reserve exist as outstanding contributions, it has been necessary in the course of the year to realize part of the Council's bonds, viz. Kr. 50,000.00, in order to meet expenses.

[2]) On May 7th the German contribution for the year 1940/41, Kr. 20,000.—, was received and on May 5th a Belgian contribution of Kr. 10,652.80 was received, Kr. 10,000.— of which has been used to cover the year 1939/40, the balance being considered part-payment for the year 1940/41.

The funds at immediate disposal, thus, amount to Kr. 94,183.21, some 70,000 of which are still invested in Danish Treasury Bonds, standing at par.

In addition the Pension Fund amounts to some Kr. 76,000.—, Kr. 65,000.— of which are invested in Bonds while Kr. 11,000.— remain at the bank.

After consultation with our chartered accountant and the permanent members of the Finance Committee—the Danish Delegates—the inclusion of the outstanding contributions for the two last years may be considered perfectly sound; those of Spain and Poland, however, have been excluded pending future developments—that of Latvia is included until news may again reach the Council from that country.

Meetings.

No meeting of the Bureau took place during the financial year 1940/41, neither has any committee had the opportunity to meet.

Only once the President has had the opportunity of visiting the Central Office—in October 1940.

II. Work in Copenhagen.

Accounts and Correspondence.

The routine work has been carried out as far as circumstances permit, accounts and correspondence being dealt with as occasion arises, but no item gives rise to special comment apart from the general fact that the existing censorship of all correspondence to some extent causes delay or even loss of letters; I must apologize, therefore, if answers to questions be late or missing.—Wherever possible honoraria have been sent to chairmen of committees or officials abroad, while honoraria for British and French officials are being reserved for later payment.

Publication and Library.

The issue of all series of publications were postponed at the beginning of 1940, and the staff engaged on such work has been working on indexing the library as to articles of general interest to the work of the Council. Under ordinary conditions no time can be spared for this extensive work—neglected for many years—but the work is already so far advanced that it may be finished before the ordinary work again will claim the full attention of the staff. Then it will be no effort of any magnitude to keep the index up to date as and when additional issues be received.

Some years ago a revision of Publ. de Circ. No. 12: "Catalogue des poissons du Nord de l'Europe avec les noms vulgaires dont on se sert dans les langues de cette région", was commenced at the initiative of English experts. The Central Office assisted in collecting lists of vulgar names from adhering countries as well as other European countries. Copies of such lists were then secured at the Central Office and the work has been taken up. The work originally limited to cover northern Atlantic waters only has been extended to cover the whole of the Atlantic north of Equator, with adjacent waters and—to make the issue of use to American biologists also—to the Pacific coast of Northern America.

A great number of publications have already been searched for local vulgar names as well as synonyms of Latin names; this work is steadily progressing and may be expected to reach far within the coming year.

Hydrography.

In continuation of last year's Administrative Report the Hydrographical Department has finished work on hydrographical observations throughout the years from the Faroe—Shetland Channel. A report on this work has been prepared by Dr. Jacobsen and is ready to be translated for later publication.

Material received from some countries for the Bulletin Hydrographique has been indexed and arranged for publication with the data for 1938 and 1939. During the last two years observations have been restricted to local waters only and the bulk of material, therefore, is fairly limited. The thermogram service of Norway is continued as far as conditions permit and thermograms reaching the Central Office have been reconstructed as usual.

Statistics.

In addition to ordinary routine work the Statistical Department has continued checking the published figures of previous Bulletins Statistiques in accordance with the decision of the Statistical Committee.

Annales Biologiques.

A series of contributions to this Report have reached the Central Office from Denmark, Germany, Norway and Sweden. The entire material has been handed to Dr. Blegvad who has undertaken to compile the report for later publication.

REPORT

of

ADMINISTRATION 1941—1942.

I. General.

Composition of the International Council for the Exploration of the Sea.

According to the Statutes of the International Council for the Exploration of the Sea the participating Governments usually renew their membership every 5 years.—In reply to the President's circular letter dated October 11th 1939, Delegates of all countries (except Poland) urged the President to do his utmost to continue the work of the Council as far as conditions would permit until the Council could meet again *in pleno*.—On July 21st, 1941, the last 5-year period expired, but encouraged by the above-mentioned correspondence and by later correspondence with members of the Bureau and Delegates of countries with whom since then it has been possible to communicate, the President—in consideration of the authorization given him in Berlin on May 17th, 1939,—and with due respect paid to the financial state of affairs—decided to prolong the budget until July 21st, 1942.

Composition of the Bureau.

At the expiration of the 5-year period the composition of the Bureau was a follows: Professor Johan Hjort, President; M. Théodore Tissier, Dr. C. Heinrici, Professor Martin Knudsen and Mr. A. T. A. Dobson, Vice-Presidents. — Mr. H. G. Maurice is Président d'Honneur.

Committees.

The Committees in being at the Berlin Meeting in May 1939 were recorded in Rapp. et Proc.-Verb. Vol. No. 109, I, p. 21—23. No change has been announced since my last Administrative Report for 1940—41.

The reports of the Committees for the year 1939 will be distributed to such Delegates and Experts as can be reached.

As last year no effort has been made to compile a general Administrative Report for 1941. Funds and Income having permitted it, all chairmen of Committees have been paid their honoraria, — in a few cases such honoraria have been retained for payment when communication again has been established.

Audit of Accounts.

On July 21st, 1941, I found it advisable to close the books by this date and to prepare a Balance Sheet confirming the financial situation. This will be found overleaf on p. 13—with the signature of the auditors and those of the Danish Delegates—permanent members of the Finance Committee.

Another Statement of Accounts for the year ending July 21st, 1942, and Balance Sheet as per this date will be found on p. 14/15; these have been duly tried and accepted by the auditors.

As to Income it will be noticed that the customary contributions have been received from Denmark, Germany, Norway and Sweden. The ordinary list

Income and Expenditure Account for the period April 1st to July 21st 1941.

	EXPENDITURE			INCOME		
	I. Incidentals			**II. Interests**		
1	President	3,000.00		On Bank Deposits	291.80	
2	Hydrographical Consultant	916.67		- Investments	1,361.11	
3	Editor of Statistics	1,000.00				1,652.91
4	Editor of the Journal	1,500.00				
			6,416.67	**Excess of Expenditure over Income**		34,625.10
	II. Headquarter Staff					
5	Administrative Secretary	3,666.67				
6	Hydrographer	916.67				
			4,583.34			
7	1st Assistant Secretary	1,833.33				
8	2nd Assistant Secretary	1,527.76				
9	Statistical Secretary	1,466.67				
10	Secretarial Assistant	825.00				
11	Hydrographical Secretary	916.67				
12	Clerical Assistance	1,475.00				
			8,044.43			
	III. Office Expenses					
13c	Stationery, books etc.	231.10				
d	Telephone, postage etc.	211.40				
f	Insurance	240.26				
g	Upkeep, cleaning etc.	442.53				
h	Miscellaneous	449.78				
			1,575.07			
14	**IV. Travelling Expenses**		50.00			
15	**V. Chairmen of Committees**		14,500.00			
16	**VI. Printing**	1,100.00				
	- Distribution	8.50				
			1,108.50			
		Kr.	36,278.01		**Kr.**	36,278.01

(sign.) W. Nellemose.

of "outstanding contributions" for the year 1941—42, has been omitted.

At the initiative of the Danish Delegates the Danish Government during July 1941 has made an extraordinary grant of Kr. 3,500 per month as from April 1st 1941, at present continuing until September 30th 1942, but which may probably be granted—temporarily—until March 31st 1943.—This extraordinary contribution was made "to cover the Council's ordinary expenditure in respect of all Danish individuals mentioned in the Berlin Estimate of 1939" (items 2, 5—12, 13 g (pt.) and 15 (pt.): Chairmen of the North-Western Area and Transition Area Committees).

From the German Government an extraordinary contribution of Kr. 20,000.— —in addition to the ordinary contribution—has been received.

The Expenditure column gives rise to the following remarks:—

Incidentals, item 1: At the termination of the last 5-year period, on July 21st 1941, the President preferred his honorarium to be retained and to be carried to his account among the Council's creditors pending the approval of the Council at a future meeting;—this honorarium as well as those of Editors (item 3 and 4) re-appear in the Balance Sheet under: Sundry Creditors.

Travelling Expenses cover one journey by the Administrative Secretary on a visit to Oslo to meet the President.

Chairmen of Committees. Wherever it has been possible to remit Chairmen of Committees the honoraria have been paid, the Balance being carried to accounts of "Sundry Creditors".

With the approval of the President and the Danish Delegates the usual expenditure of carrying Kr. 3,500.— to the special Pension Fund has been omitted this year.

From the Statement of Accounts it will be noticed that the income exceed expenditure by Kr. 34,357.11.

Statement of Pension Fund Account.

EXPENDITURE			INCOME		
Balance as per July 21st 1941		77,497.69	Balance as per April 1st, 1941		75,976.56
			Interests:		
			On Bank Deposits	137.80	
			- Investments	1,383.33	
					1,521.13
		Kr. 77,497.69			Kr. 77,497.69

Balance Sheet, July 21st, 1941.

LIABILITIES			ASSETS		
Capital Reserve:			Cash at Handelsbanken	24,413.92	
Balance as per April 1st, 1941	260,329.84		— - Ordrup-Charlottenlund Bank	1,469.66	
less excess of Expenditure over Income	34,625.10		— in hand	536.59	26,420.17
		225,704.74			
Pension Fund		77,497.69	Danish Treasury Bonds as per July 21st, 1941 nom. value Kr. 70,000.00, at cost		69,292.73
Total Funds		303,202.43	(market value on July 21st Kr. 71,575.00)		
Sundry Creditors as per July 21st, 1941:			Pension Fund:		
Chairmen of Committees and Editors	21,000.00		Cash at bankers	11,427.39	
Sundry Creditors	118.57		Debtors (Interests per July 21st, 1941)	1,167.38	
		21,118.57	Treasury Bonds nom. value Kr. 66,000.00, at cost	64,902.92	
			(market value on July 21st Kr. 66,966.25)		77,497.69
			Sundry Debtors as per July 21st, 1941: [1]		
			Contributions from 1939/40	55,000.00	
			— - 1940/41	94,347.20	
			Interests per July 21st 1941	1,598.01	
			Sundry Debtors	165.20	
					151,110.41
		Kr. 324,321.00			Kr. 324,321.00

[1]) Outstanding Contributions from Spain 1938—41 (Kr. 60,000.—) and those from Poland 1939/41 (Kr. 20,000.—) not included.

(sign.) W. Nellemose.

We have scrutinized the foregoing Balance Sheet and are satisfied that it is correct.

(sign.) Martin Knudsen. H. Blegvad.

Johan Hjort.

We have compared the above Balance Sheet with the Books and Vouchers of the Council, and certify that it is in accordance therewith. We have verified the existence of the cash in hand and at bankers as well as of the Treasury Bonds.

Copenhagen, 22nd August, 1941.

(sign.) J. Ejlersen. Karl Sørensen.
State-Certified Auditor. State-Certified Auditor.

Income and Expenditure Account for the year ending July 21st 1942.

EXPENDITURE

	I. Incidentals		
1	President	6,000.00	
2	Hydrographical Consultant	3,000.00	
3	Editor af Statistics	2,000.00	
4	Editor of the Journal	3,000.00	
			14,000.00
	II. Headquarter Staff		
5	Administrative Secretary	12,000.00	
6	Hydrographer	3,000.00	
			15,000.00
7	1st Assistant Secretary	6,000.00	
8	2nd Assistant Secretary	5,000.00	
9	Statistical Secretary	4,800.00	
10	Hydrographical Secretary	3,000.00	
11	Secretarial Assistant	2,700.00	
12	Clerical Assistance	4,333.33	
			25,833.33
	III. Office Expenses		
13a	Rent	5,580.00	
	b Heating and light	1,081.14	
	c Stationery, books etc.	575.99	
	d Telephone, postage etc.	797.39	
	f Insurance	460.91	
	g Upkeep, cleaning etc.	1,713.24	
	h Miscellaneous	896.63	
			11,105.30
14	**IV. Travelling Expenses**		318.00
15	**V. Chairmen of Committees**		29,000.00
16	**VI. Printing and Distribution**		
	a Printing	931.91	
	b Drawings, translations	495.00	
	c Distribution	9.10	1,436.01
	Total Expenditure...		96,692.64
	Excess of Income over Expenditure		34,357.11
			Kr. 131,049.75

INCOME

	Ia. Annual Contributions		
	Germany	20,000.00	
	Denmark	10,000.00	
	Norway	10,000.00	
	Sweden	10,000.00	
			50,000.00
	b. Extraordinary Contributions		
	Denmark ($^1/_4$ 1941—$^{31}/_7$ 1942)	56,000.00	
	Germany	20,000.00	
			76,000.00
	II. Interests		
	On Bank Deposits	736.56	
	On Investments	3,715.86	
			4,452.42
	III. Sale of Publications		584.33
	Refund of money formerly written off		13.00
	Total Income...		Kr. 131,049.75

(sign.) W. Nellemose.

Balance Sheet.

Comparing this year's Balance Sheet with that published with last year's report (as per March 31st 1941), it will be noticed that the reserves have hardly been touched, the reserves to-day being Kr. 268.— only less than 16 months ago.—During this period a number of outstanding contributions have been received from various countries, such debtors thereby being reduced from Kr. 180,000.— to 124,348.04. It will be remembered that it had been necessary in 1940/41 to realize part of the investments (Kr. 50,000.—); the payments from debtors have made it possible to re-invest Kr. 34,000.— thereby increasing the investments from some 69,000.— to about 103,000.— Kr. Since closing the books for the year the French Government has paid Kr. 20,000.— —the contribution for the year 1939—40; this payment enables me to increase the investments to the pre-war height: Kr. 120,000.—.

As far as interests are concerned, I have to report that compulsory conversion of Danish Treasury Bonds has decreased the rate of interest from 5 % to $4^1/_2$ %.

The Pension Fund has increased from Kr. 75,976.56 to Kr. 81,286.93 from interest added to Capital.

For the convenience of the Delegates I beg leave to specify outstanding contributions mentioned in the Balance Sheet on p. 15 as follows:

1939—40: Great Britain 20,000.—; France 20,000.— (paid on July 23rd, 1942) and Latvia 5,000.—.

Statement of Pension Fund Accounts 1941—1942.

EXPENDITURE			INCOME		
Balance as per July 21st 1942		81,286.93	Balance as per July 22nd, 1941		77,497.69
			Interests		
			On Bank Deposits	56.63	
			On Investments	3,732.61	
					3,789.24
		Kr. 81,286.93			Kr. 81,286.93

Balance Sheet, July 21st, 1942.

LIABILITIES			ASSETS		
Capital Reserve			Cash at Handelsbanken	59,245.47	
Balance as per July 22nd, 1942	225,704.74		— - Ordrup-Charlottenlund Bank	4,602.08	
plus Excess of Income over Expenditure	34,357.11		— in hand	1,826.66	
		260,061.85			65,674.21
Pension Fund		81,286.93	Danish Treasure Bonds as per July 21st, 1942, nom. value Kr. 104,000.— (Market value on July 21st, 1942: Kr. 107,045.—)		102,871.38
Total Funds...		341,348.78	Pension Fund		
Sundry Creditors as per July 21st 1942			Cash at bankers	2,329.24	
President, Editors and Chairmen of Committees	33,475.20		Debtors (Interests per July 21st, 1942)	1,369.77	
Sundry Creditors	793.57		Treasury Bonds, nom. value Kr. 78,000.— (Market value on July 21st, 1942: Kr. 80,906.25).	77,587.92	
		34,268.77			81,286.93
			Sundry Debtors as per July 21st, 1942[1]		
			Contributions from 1939/40	44,999.42[2]	
			— — 1940/41	79,346.62	
			Interests per July 21st, 1942	1,372.79	
			Sundry Debtors	66.20	
					125,785.03
		Kr. 375,617.55			Kr. 375,617.55

[1]) Outstanding Contributions from Spain 1938—41 (Kr. 60,000.—) and those from Poland 1939/41 (Kr. 20.000.—) not included.
[2]) Received from France Kr. 20,000.— on July 23rd, 1942.

(sign.) W. Nellemose.

We have scrutinized the foregoing Balance Sheet and are satisfied that it is correct.

(sign.) Martin Knudsen. H. Blegvad.

Johan Hjort.

We have compared the above Balance Sheet with the Books and Vouchers of the Council, and certify that it is in accordance therewith. We have verified the existence of the cash in hand and at bankers as well as of the Treasury Bonds.

Copenhagen, 24th August, 1942.

Revisions- og Forvaltnings-Institutet Aktieselskab.

(sign.) J. Ejlersen
State-Certified Auditor.

(sign.) Karl Sørensen
State-Certified Auditor.

1940—41: France 20,000.—; Great Britain 20,000.—; Belgium 9,347.20; Eire 10,000.—; Iceland 10,000.—; Latvia 5,000.— and Portugal 5,000.—.

After consultation with the auditors the outstanding contributions from Poland and Spain have been omitted for the time being.

Meetings.

No meetings of the Bureau have taken place during the year, and the President has been prevented from visiting the Central Office.—In January I had an opportunity of visiting the President in Oslo.

II. Work at the Central Office in Copenhagen.

Accounts and Correspondence.

The routine work has been carried out as far as circumstances permit, accounts and correspondence being dealt with as occasion arises, but no item gives rise to special comment apart from the general fact that the existing censorship of all correspondence to some extent causes delay or even loss of letters; I must apologize, therefore, if answers to questions be late or missing.

Publication and Library.

The issue of all series of publications was postponed at the beginning of 1940 pending financial developments. Thanks to contributions still coming from a number of countries and to outstanding contributions coming in from time to time the financial position now seems so far secured that the President has permitted the publication of all arrears, viz., Bulletin Hydrographique for the year 1938, Bulletin Statistique for the year 1938, the Administrative Report for the year 1939,—these publications are now going to press.

A series of contributions to the *Annales Biologiques* have been received for publication; although they do not represent the work of all Area Committees they are considered so representative that published they may serve as a good foundation for future discussions as to shape and manner of presentation; this publication is at present in the hands of the printers.

A report by Dr. Jacobsen on the material of observations from the Faroe-Shetland Channel has been translated and is now in print with a number of other reports on various matters, thus forming a volume of the series Rapp. et Proc.-Verb.

The work on indexing the library, mentioned in last year's report, is progressing satisfactorily.

The work on the *Catalogue of Fish Names* also is progressing rapidly thanks to financial assistance granted the Administrative Secretary as a private individual by the "Rask-Ørsted-Fond". This financial assistance has enabled me to engage valuable extra help to carry on the compilation of fish names.

Hydrography.

Hydrographic observations have not been received during the past year. The hydrographical staff has continued the work on the Faroe-Shetland material.

Statistics.

No statistics on fishery have been received. The Statistical Secretary has continued the revision of earlier Bulletins Statistiques.—It is hoped to have the revision completed before again resuming the ordinary statistical work.

W. Nellemose.
Adm. Secr.

Reports of Area Committees.

NORTH-EASTERN AREA COMMITTEE

1939.

By

Oscar Sund.

Reports on work done in the North-Eastern Area have been received from committee members representing the following countries:— England, Finland, Germany, Norway, and Scotland.

The research work at sea was cut short or considerably hampered by the outbreak of hostilities. Otherwise the crop of observations would no doubt have been greater than in any earlier year.

CRUISES.

From the **English** side two voyages on steam trawlers, one in May, the second in September, were arranged for. Only the May voyage was carried out.

The **Norwegian** activities at sea included contributions from the following institutions:—

The Geophysical Institute, Bergen, made occasional hydrographic observations in the fjords near Bergen.

The Tromsø Museum, Tromsø, made a cruise to the West Finmark waters in April, and has also repeated the regular oceanographic investigation of the fjords in the vicinity of Tromsø.

The Fisheries Directorate, Bergen, had its research vessel, the "Johan Hjort", in commission from January 23rd to November 2nd for a series of oceanographical, plankton, and young-fish cruises along all Norwegian coasts and banks except in the Skagerak but inclusive the W. Spitsberg waters (see: "Oceanography"). For oceanography-observations during the winter herring fishery on the west coast and the occurrence of herring shoals by means of echo sounder, the Directorate hired the "Armauer Hansen" for the period January 27th to March 2nd. For work in the west coast fjords the Directorate's launch "Virgo" was used in all 39 days from March to September incl.—The whole summer, from May till September, the fishing conditions in Spitsbergen waters were investigated by means of a line-cutter hired for this purpose, the "Solveig I". A regular programme of oceanographical observations was carried out at the same time.

The University of Oslo (Biological Laboratory and Botanical Laboratory) organised in June and again in August oceanographical and plankton observations along the entire length of the Oslo Fjord.

The **Scottish** research vessel, the "Explorer", extended her March and April cruises into the Norwegian Deep, in March along the parallels 60° and 61° N., in April along 55°30′ N. Besides oceanographic observations, plankton and young-fish gear were used.

OCEANOGRAPHY.

The contributions of the different countries in 1939 to the oceanographical investigation of the area were as follows:—

Finland.

Dr. Granqvist writes:— "What we have done in the Barents Sea has come to an end. (1) In the autumn (August 1st) we started a temperature station at Vaitholahti lighthouse where the shore temperature was measured every day. Observations for two months are extant. (2) In the Petsamo Fjord determination of temperature and salinity every 11 days at the

surface and at the usual depths was commenced in August. No records of observations are extant. (3) Orders were given in October regarding fortnightly observations of the same elements at a place with deep water NE. of the Henø islands (mouth of the Varanger fjord), but the start of the work was prevented by the outbreak of war."

Both Vaitholahti (NW. point of Fisherman's peninsula) and the place referred to under (3) are situated within those parts of the Petsamo district which were ceded to Russia in March 1940.

Scotland.

The sections mentioned above across the North Sea, in March along 61° and 60° N., in April along 55°30′ N., fit well together with the Norwegian sections along 60°40′ at the end of April and along 59° in the first days of May so as to elucidate the spring conditions over a wide area. The data will be published in the *Bulletin Hydrographique*. The spring influx of Atlantic water was found to be decidedly weaker than usual. This finding was confirmed by the surface drift bottle results. Normally, Norwegian coastal recoveries predominate, but during the year under review remarkably poor returns were obtained from the Skagerak and from the North Sea sector of the Norwegian coast between the Naze and Lat. 61° N.

Norway.

The amount of oceanographical work carried out in 1939 did not differ greatly from that of 1938. The material flows from three different sources:— from the cruises of the fishery research vessels, from the fortnightly observations at all depths made at a number of places with deep water in free communication with the open sea,—and from the thermographs installed in liners.

The distribution of oceanographical material from the cruises may be represented thus:—

Area	Number of Stations						No. of Observations			
	Jan./ Feb.	Mar./ Apr.	May/ June	July/ Aug.	Sept./ Oct.	Total	T + S	O	pH	P
W. coast and N. Sea	47	34	22	1	4	108	944	140	—	—
W. coast fjords	—	10	15	25	7	57	510	—	—	—
Stat—Vikna	19	4	6	3	21	53	503	250	42	42
Nordland	95	128	43	11	93	370	3247	2101	160	705
Troms	5	18	34	5	13	75	799	278	52	70
Finmark	14	—	109	1	—	124	1216	656	—	62
Svalbard	—	—	—	40	—	40	400	—	—	—
Total...	180	194	229	86	138	827	7619	3425	254	879

The fortnightly observations at all standard depths were made at five places: (1) Sognesjøen (mouth of the Sognefjord), (2) at Skråva in the Westfjord, (3) at Eggum (north side of Lofoten), (4) at Ingøy (W. Finmark), and (5) at Vardø (E. Finmark). The interesting results obtained from these permanent stations have made it desirable to extend this system also to the SW. parts of the coast and it is hoped shortly to institute two new stations near the deep water of the Norwegian Channel, namely, at Utsira and at Lister.

The thermograph service has been running as during the last five years, except that the line Bergen—E. Iceland unfortunately has been discontinued while the lines from Bergen to Reykjavik, to Newcastle, to Rotterdam, Oslø and Kirkenes (E. Finmark) have been in regular operation as well as the summer line from Tromsø to Spitsbergen.

PLANKTON.

Scotland.

During the cruises alluded to above, the plankton was investigated.

Norway.

The Biological and the Botanical Laboratories of the University of Oslo collaborated on a regional, quantitative investigation of the phytoplankton of the Oslo fjord at two epochs, June and August, with simultaneous observation of oxygen content of the water and of the submarine illumination. This latter investigation was continued through autumn and winter in the inner Oslo fjord. The experiments with plankton cultures in submerged flasks were continued.

During the cruises of the Directorate of Fisheries plankton collection forms a regular item on the programme. In 1939, 285 vertical hauls were made with the net "8/72" (silk 8, diam. 72 cm.), 97 horizontal subsurface hauls with "0/100" and surface hauls with the same at most oceanographical stations.

YOUNG FISH.

During the **Scottish** cruises in the North Sea and the Norwegian Channel many herring larvae were found in the plankton off Egersund while numerous saithe larvae were obtained in the region of the Viking Bank.

During the **Norwegian** cruises the use of plankton nets is, of course, mainly directed towards the determination of the relative quantities of the eggs and larvae of the common food fishes. The older stages were fished for during the autumn cruises by means of strand seines and also by means of shrimp trawl

(in deeper waters). The number of trawl shots was 23, of hauls with seines: 14.

Experimental work. Mr. ROLLEFSEN's experiments (for the Directorate of Fisheries) with crossing plaice and flounder with a view to supplying a means of determining the success (if any) of the hatching of sea fish as usually practised, were continued and led, i. a., to great improvements in technique by the introduction of a good source of live food for the fish fry. It is now considered as a possibility to raise very large numbers of flat fish to bottom stage and work in this direction is continued in 1940.

Echo sounding. The echo gear of the "Johan Hjort" rendered very interesting results in determining the varying extent and location of the largest dense swarm of spawning cod at Lofoten. It appeared very definitely that the displacements observed were connected with changes in direction and force of the winds.

During the autumn cruise small herring shoals were located in a number of fjords, and in one place (Femrisfjord, lat. 67°) an endeavour was made to study the behaviour and movements of a particular shoal by repeated observation, during a few days, of its position in the water and of the simultaneous oceanographical circumstances.

The extent of the spawning herring shoals on the west coast can be roughly estimated from echo data obtained during the cruises of the "Armauer Hansen" in January—March.

During 1939, the Fisheries Directorate produced a bathymetrical chart of the Westfjord in 1/100,000, based on echo sections gathered by the "Johan Hjort" during 1935—38. A reduction to $^1/_6$ has been printed.

FISHES.

Biological Statistics etc.

England.

During the voyage of two members of the Lowestoft staff in a trawler in May (referred to above) a considerable amount of material for age determination was acquired. Plaice, cod and haddock were marked.

Germany.

The following numbers of fish were measured in German ports in 1939 up to the outbreak of hostilities:

Place of origin	Cod	Haddock	Saithe	Redfish
Barents Sea	528	399	—	359
Bear Island	3,555	3,172	1,037	1,160
Coast of Norway	4,341	5,028	1,121	1,614

Norway.

Cod. An extensive material of measurements and otoliths has been gathered from the great coastal fisheries for spawning cod along the coast from Møre towards Senja in February—April and of feeding shoals ("caplin cod") on the Finmark coast in March to May. The number of cod measured amounted to about 140,000 and the number of otolith samples collected was well over 2000. Herring. In all 56 samples of the different kinds of herring were investigated as to size, weight, age, type of winter-rings, vertebral number, sexual stage and general condition (fat).

The sprat population has been under regular supervision through investigation of numerous samples collected at the best fishing places from purse seine catches.

Material on plaice and halibut was gathered in a more occasional way, supplementing the investigations of later years. A paper on the biology of the plaice is in the press.

Literature

appeared in 1939 on investigations in the N.-E. Area.

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NORTH-WESTERN AREA COMMITTEE

1939.

By

Å. Vedel Tåning.

During the year the Committee continued work according to the general programme followed for several years. Moreover special attention has been paid to the two proposed closures of areas in Icelandic and Faroe waters, and members of the Sub-Committee on the Faxa Bay Question met in Reykjavik in July to consider the proposal of a closure of Faxa Bay. The members were guests of the Icelandic Government during the visit to Iceland. Several reports have been given on the Faxa Bay Question to be issued later.

On the Faroe question a general report has been distributed between the members of the Sub-Committee and various work is in progress concerning this question.

In the following pages a survey of the more important work carried out in the North-Western Area during the year has been given. Reports from some members have, however, not been available owing to the international conditions.

The following vessels have operated in the area during 1939:— from **Denmark** the research vessel "Dana" has operated in Faroe and Iceland waters, as well as in the Denmark Strait; the motor cutter "Amy" carried out work at the Faroes; the M/B "Umarissok" operated in Greenland waters; from **Iceland** the patrol vessel "Þor" carried out work in Faxa Bay and Breide Bay; moreover a trawler and a Danish seine boat carried out work in Faxa Bay when the members of the Sub-Committee on the Faxa Bay Question visited the area. The patrol vessels M/S "Sæbjörg" and "Oðinn" were commissioned for research work especially off the north coast during summer and fishing experiments were made by two chartered commercial trawlers; from **Scotland** the research vessel "Explorer" operated in Faroe waters.

By other means material was collected by Denmark, Germany, Iceland, and Norway for the study of fish populations and physical conditions.

The hydrographical and planktonic observations made in the area during the year are reported on by the respective Committees or published in the *Bulletin Hydrographique*.

Owing to the international situation the work in the area had to be closed late in August, some work even earlier.

Denmark.

A cruise to the area was carried out during 1939 by the "Dana", late in the season owing to various alterations to the research vessel.

The vessel operated in the Faroe Area from July 13th to July 18th and again August 11th—25th; in the Iceland Area inclusive the Denmark Strait the vessel operated in the period July 19th to August 10th.

During the months of July and August the motor cutter "Amy" of Skagen operated in Faroe waters, especially on the coastal banks and in the fjords. Moreover various special collections and observations were as usually secured by means of patrol vessels, motor boats etc.

Faroe Waters.

The ordinary routine work was carried out in the area, see Fig. 1.

Cod. Material from commercial catches for the study of fluctuations in the stock was secured from the autumn fishery, a total of about 8,800 measurements and about 400 samples of otoliths were collected. From the spring fishery material was not obtained, *inter alia*, because the fishery was extremely poor.

The "Dana" operations showed that the youngest age-groups were poorly represented on the banks as well as in the fjords. Marking of cod during September had to be postponed owing to the war.

A paper on the migration of large cod marked on the spawning grounds during the spring of several years has been issued (see list of literature, Tåning).

Fig. 1. "Dana" Stations at the Faroes, 1939, July and August.
× Pelagic Stations; ○ Trawl and other Bottom Implements; • Hydrography only.

Various investigations on the cod have been continued with regard to the proposed closure of certain areas off the islands; a preliminary survey has been issued to the benefit of the members of the Sub-Committee appointed to consider the question.

Haddock. Samples of scales and measurements were secured and will as previously be handed over to the Aberdeen Laboratory. The 0-group haddock was abundant everywhere on the banks, also on the Faroe Bank; also, the I-group was well represented at the Faroes.

Halibut. About 600 measurements were secured of commercial catches by native fishermen and about 250 samples of otoliths were collected. Marking of 3 to 5-year-old halibut was continued in the fjords and on the banks (by M/C "Amy"); 137 specimens were liberated. Recaptures of specimens marked during 1937 and 1938 have been recorded both from the Faroes and from Iceland and the British islands. The total percentage of recaptures has now been 33·7 % for the experiments 1937 and 1938.

Herring. A few pelagic stages of the spring-spawning herring were secured during July, having the size ordinary of the season, viz., about 3·5 cm. A sample of summer-spawning herring was obtained for subsequent investigation.

Lemon Sole. During the months July-August a general survey of the lemon sole stock was carried out on the coastal banks and in the fjords. The motor cutter "Amy" operated with a sole-trawl furnished with rubber bobbins in about 40 localities. The type of trawl proved to be useful and on the best localities hauls of 40—60 kg. per one hour haul were obtained. Large areas proved to be good for the implements used, on the other hand several were also very bad as expected. Stand nets were used in several fjords.

Material for the study of growth, food etc. of the lemon sole was secured.

Other Species of Fish. As usual all material of other species was measured, and otoliths taken of the more important species.

Norway Lobster. During the operations by the M/C "Amy" in the fjords special attention was paid to the Norway lobster; these investigations with the lobster trawl were commenced in 1937 and have been continued in 1938 and 1939.

2,766 specimens were marked, partly in the Kalbak Fjord and partly in the Sundene; the recapture percentages per 10 hours trawling were 2·8 and 1·8 respectively. Studies of the smallest bottom stages were carried out.

Whales. The following numbers of the different species of whales were caught during the year from the two whaling stations at the Faroes: 153 fin whales, 8 sei whales, 2 blue whales, 1 humpback and 9 sperm whales.

The Ca'ing whale (Blackfish) was abundant during the year and 2,716 specimens were secured by the natives.

Hydrographical Observations were secured from most localities operated; the section North Uinst to Nolsø was operated 13th—14th of July. Pelagic hauls showed that *Doliolum* and other Atlantic organisms were present in the eastern part of the Channel. The Myggenæs observations have been continued as previously. See moreover the report of the Hydrographical Committee.

Icelandic Waters.

The "Dana" carried out operations in this area from July 19th to August 10th. The ordinary routine work securing information on the most important species of fish was made. During the whole cruise the weather was exceptionally fine and warm, more so than during any other cruise in these waters during this century.

The vessel commenced work at south-east Iceland and made a clockwise circumnavigation of the island (Fig. 2) with a cruise from north-west Iceland westwards to the area off Angmagssalik, East Greenland.

Observations from Danish patrol vessels were obtained until the international situation discontinued this work.

Cod. The drift of cod fry was studied round Iceland and in the Denmark Strait. The year was outstanding in the fact that huge masses of warm Atlantic water were present off the west coast and the north coast, here even warmer and going deeper (down to about 400 m.) than ever met with in this century. This very prominent influx of warm water to the north of Iceland had carried the cod fry especially to this part

Fig. 2.
"Dana" Stations round Iceland, 1939, July and August.

○ Trawl and other Bottom Implements;
× Pelagic Stations;
• Hydrography only.

of the Iceland area and owing to the favourable conditions in the sea the cod fry had reached a far larger size than ordinary of the season. In this respect the year showed a feature quite opposite to the preceding year. It is also worthy of notice that 0-group bottom stages in the beginning of August had reached the east coast, about a month earlier than usual. As far as could be ascertained no drift had taken place to the west, across the Denmark Strait. The I-group cod was abundant at the south-east coast of Iceland, elsewhere poorly represented.

Cod marking was not carried out in Iceland waters during the year. Recaptures of cod marked during previous years were abundant, and immigrants of West Greenland origin (tagged there during the years 1934 to 1938) were more plentiful than in any other year, viz., 61 specimens.

Material for age-determination etc. of the younger age-groups was secured in various localities.

Haddock. The anticyclonic drift of fry was also studied in this species and the result was similar to that obtained on the cod; compared with the results of the preceding year it was interesting to notice the difference: viz., in 1938 no fry at all off the north coast, in 1939 fry along the whole north coast and of a much larger size than usual for the season. The I-group was according to observations very poorly represented north and east of the island. On the south coast the 0- to III-groups were well represented. In the Faxa Bay—west coast—the I-group was also poor, the II-group (1937 year brood) and the 0-group, however, well represented. Material for age determination was secured as usual.

Plaice. The year-class 1935 was outstanding in the south (about 60—70 %), in the west (about 60 %) and in the north (about 60 %); in the east it amounted to about 30—35 %, the 1934- and 1933-brood also being of importance here. Eel-hand-seine hauls on the north and east coast showed that the 1938-brood was of some importance on the north coast (of this kind of hauls none were made in the west and in the south). Hand-shove-net was used in the tidal zone of the north coast and showed that the 1938-brood was rather plentiful here; this is of interest compared with the facts noted above on the cod of this year-class.

Halibut. In the Faxa Bay the I- and II-groups were abundant. The 0-group bottom stages appeared here earlier than usual and their size surpassed that observed previously; this fact is rather remarkable and definitely correlated to the stronger influx of warmer Atlantic water at an earlier date than usual. Marking experiments on young halibut were continued and several recaptures from previous years' experiments in these and Faroe waters were recorded from the Icelandic area.

Lemon Sole. The amount taken by trawlings was above normal in the Faxa Bay.

Herring. Towings on the south and west coasts showed that fry of the summer-spawning race was present on these coasts, in highest numbers in the Selvogsbanki area on the south coast (about 1600 specimens in a 30-min. haul with the 2-m. stramin-net), poorly represented to the south-east.

Other Species of Fish. As usual all material from trawlings etc. was measured, material of otoliths secured etc. Pelagic fry recorded as usual.

Deep-Sea Prawn (*Pandalus*). The prawn-trawl was operated in the same locality off the north coast as in 1938, the result was poor, probably owing to the high temperatures prevailing this year in deep water also.

Faxa Bay Operations. These were carried out during the last part of July. Members of the Sub-

Committee on the Faxa Bay Question were present from July 25th to 27th (a special report on this meeting will be published later). Several other days were used by the "Dana" for the ordinary trawling routine work in the bay, and a general bottom sampling survey of the bay was made.

Plankton and **hydrographical observations** were carried out as usual during the cruise; the hydrographical sections were secured in collaboration with Iceland until the outbreak of the war (see also the reports of the special Committees).

Denmark Strait.

A survey of the drift of **cod fry** was carried out from north-west Iceland to Angmagssalik; as mentioned no cod fry was obtained. **Current bottles** were liberated during this part of the cruise as also during the circumnavigation of Iceland.

West Greenland.

1) Coastal Waters. Professor Ad. S. Jensen, fishery adviser to the "Grønlands Styrelse", has reported on work in these waters during 1939.

In 1939 the fishery investigations have been carried out in the coastal waters and fjords from May to October by Mr. Paul M. Hansen from the M/B "Umarissok". The motor boat has operated between Holsteinsborg (at about 67° N. Lat.) and Nanortalik (at about 60° N. Lat.).

Cod. As in the two previous years the distribution of pelagic cod larvae in the area was surveyed by means of the 1-m. stramin-net. The three youngest age-groups of cod were fished for with the eel-hand-seine approximately at the same localities as in the two previous years. In these catches the 1936 year-class was found to be predominant as in 1937 and 1938. Some 4000 young cod from the eel-hand-seine catches were measured. In order to investigate the age composition of the stock of full-grown cod a number of otoliths (together with length measurements) have been secured partly during fishing operations from the M/B "Umarissok" and partly from commercial catches landed at the various fishing ports of West Greenland. A total of 3400 samples were secured and analysed.

The results of the age determinations are as follows:

Age-group	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Year-class	1936	35	34	33	32	31	30	29	28	27
Northern districts ..... %	0·1	3·4	19·6	5·1	13·1	15·1	3·1	7·7	3·1	4·2
Southern districts ..... %	0·6	10·0	30·5	13·4	16·5	9·1	1·1	5·1	0·8	2·2

Age-group	XIII	XIV	XV	XVI	XVII	XVIII	XX	XXII	No. of
Year-class	1926	25	24	23	22	21	19	17	specimens
Northern districts ..... %	16·0	0·1	6·0	0·1	2·8	0·1	0·2	0·2	2,262
Southern districts ..... %	5·4	—	3·2	—	1·7	—	0·1	0·3	1,158

The richest year-class was the 1934 year-class, which for the first time entered the commercial catches (as the V-group). In the northern districts the 1926 year-class was the second important year-class by number of individuals, the first one, however, by weight owing to its high age (the XIII-group).

A total of 871 cod has been marked and liberated in the Holsteinsborg, Godthaab, Frederikshaab, and Julianehaab districts.

Halibut. Only about 20 samples of otoliths were collected during fishery operations from the "Umarissok". Samples of otoliths of halibut have not been taken at the fisheries station of Kangamiut as usually, because halibut fishery has not been carried out during the year.

Greenland Halibut. Only 24 specimens have been marked in the Lichtenaufjord in the Julianehaab district in 1939.

From the marking experiments on Greenland halibut at Jacobshavn in 1935 and 1936 two specimens from each experiment have been recaptured in 1939.

Salmon (*Salmo salar*). At Kapisigdlit in the Godthaabfjord 12 scale-samples were collected from spent salmon moving down the river from the lakes. Moreover 25 scale-samples of salmon taken in the sea before entering the lake for spawning have been collected by a Greenlander. The results of the readings of the scales will be published later on.

Char (*Salmo alpinus*). In the Julianehaab district 1767 chars caught by eel-hand-seine have been measured. More than 500 samples of otoliths have been secured. The specimens from which otoliths were taken have been measured, weighed and sexed. The age determinations show that the age-groups between VIII and XIII are predominating in two of the catches. Vertebrae-countings on 99 chars from Kangermiutsiait show the following values:—

	64	63	62	61	60	59	..	Total	Average
No. of vertebrae ..									62·01
No. of specimens ..	5	21	49	19	4	1		99	

The **Caplin** (*Mallotus villosus*) occurred only in small numbers in the Godthaab and Frederikshaab districts in 1939. Only about 300 were taken by eel-hand-seine at Kapisigdlit in the Godthaabsfjord.

The results of age determinations upon otoliths were:

♂♂

Age-groups	No. of specimens	%	Average length, cm.
III	20	10·6	13·0
IV	105	55·9	13·4
V	53	28·2	13·6
VI	10	5·3	13·6
Total	188	100·0	

♀♀

Age-groups	No. of specimens	%	Average length, cm.
III	27	22·5	11·6
IV	81	67·5	12·4
V	10	8·3	12·5
VI	2	1·7	13·0
Total	120	10·00	

In the Julianehaab district a sample of about 100 caplins was collected from stomachs of chars. The otoliths and skeletons were secured for age and race investigations. A sample of some hundred caplins has been obtained from Angmagssalik on the east coast of Greenland.

Herring. About 1200 herring were measured in the Sukkertoppen district and about 500 in the Julianehaab district, where herring were less numerous than in the previous years. Samples of scales and otoliths from the various catches were taken.

Uvak (*Gadus ogac*). 150 specimens from the Julianehaab district have been measured, the sex determined and otoliths have been secured for age determination.

Greenland Shark (*Somniosus microcephalus*). In Kvane Fjord in the Frederikshaab district a number of 77 Greenland shark have been marked and liberated. A number of 22, which were wounded by the hooks and unfit for marking experiments, were measured only and the sex determined.

As usual **temperature** observations were made at different localities in the investigated area. The temperatures were considerably higher than in 1938.

2) Offshore Waters: **Cod.** Measurements of commercially caught fish were secured from the offshore banks in a number of 1850, and a material of about 200 otoliths was obtained. The emigration of cod from West Greenland to Iceland has been strong during the year; on this item a few details have been given above.

Halibut. From the commercial fishery on the offshore Greenland banks no material was secured during the year.

Whales. The result of the whaling boat "Sonja", particularly operating in these waters for local consumption, was poor, 3 fin whales and 2 humpbacks only being caught.

Hydrographical Observations. The routine sections off the west coast were operated by the Danish patrol vessel until the vessel was withdrawn from these waters. On coastal-water operations see above.

Éire. (G. P. Farran).

No work carried out in 1939.

England. (F. M. Davis).

No work was carried out in this area, but a member of the staff of the Fisheries Laboratory attended a meeting of the Faxa Bay Committee at Reykjavik in July.

France. (Ed. le Danois).

No report has been received.

Germany. (A. Hagmeier).

A scientist on board a commercial trawler working in the area south-east of Iceland secured biological data especially on the Norway haddock. Plankton material was collected during the cruise.

Market measurements of various species of fish were secured of landings from the Icelandic area until the outbreak of the war; the following species were measured:—

	Cod	Haddock	Saithe	Norway Haddock	Total
No.	4,137	6,670	1,325	1,325	13,457
kg	16,459	11,016	5,820	2,350	35,645

The method of age determination of Norway haddock has been the object of continued investigations.

A paper has been issued by Dr. A. Meschkat (see list of literature).

Holland. (J. J. Tesch).

No work carried out in 1939.

Iceland. (Árni Friðriksson).

The marine investigations carried out in Icelandic waters have been organized by the Fishery Department of the University Research Institute, Reykjavik.

Work at Sea. Two trawling cruises on the "Þór" were made, the first in Faxa Bay on March 28th—April 2nd, the second in Faxa Bay and Breida Bay May 11th—27th. Moreover fishing experiments took place in Faxa Bay in connection with the visit of some members of the Faxa Bay Sub-Committee in July, viz., on the steam-trawler "Geir" on July 25th—26th and on a Danish seine boat on July 26th. Finally, fishing experiments were carried out in April on several deap-sea grounds all round the country on two steam-trawlers. Two patrol vessels, viz., the M/S "Sæbjörg" and the M/S "Oðinn" were commissioned for research work mainly off the N.-coast

during the months May—September, when many plankton samples were collected and a great number of temperature observations was made.

Cod. About 44,600 cod from the commercial fishery and from cruises on the "Þór" and the "Geir" were measured and 4,022 age analyses were carried out. The age composition of the stock in the warm-water area during the spawning season was as follows (see Table A).

Thus the 8 and 9-year-old fish (the broods of 1931 and 1930) were predominating in the stock. The age composition was quite different in the cold-water area during summer and autumn, viz., (see Table B).

Table A

Locality			< 8 years	8—9 years	> 9 years	Totals
Hornafjord,	SE.-coast,	Line	70·4	10·7	18·9	100 %
Westm. Isl.	S.-coast,	Line	12·0	52·2	35·8	100 -
—	—	Net	4·1	44·2	51·7	100 -
Keflavik,	SW.-coast,	Line	23·6	49·4	27·0	100 -
—	—	Net	10·8	49·5	39·7	100 -
Reykjavik,	SW.-coast,	Line	15·0	58·0	27·0	100 -
Akranes,	SW.-coast,	Line	27·2	56·9	15·9	100 -
Flateyri,	NW.-coast,	Line	51·2	35·4	13·4	100 -

Table B

Locality			< 8 years	8—9 years	> 9 years	Totals
Flateyri,	NW.-coast,	Line	71·4	16·9	11·7	100 %
Siglufjord,	N.-coast,	Line	97·0	2·0	1·0	100 -
Nordfjord,	E.-coast,	Line	93·5	5·0	1·5	100 -
Trawlers			90·0	9·0	1·0	100 -

Here 4-year-old cod (the 1935-brood; NW. = 21·7 %; N. = 67·0 %) and 5-year-old cod (the 1934-brood; E. = 44·5 %, trawlers = 53 %) were found as the main components of the stock.

Weighing of 1000 spawning cod in Keflavik was carried out in order to find the relation between size and weight and the results were as follows:—

cm.	kg.	cm.	kg.
135—139	25·00	85—89	6·10
130—134	22·30	80—84	5·10
125—129	19·50	75—79	4·20
120—124	17·00	70—74	3·30
115—119	15·00	65—69	2·60
110—114	13·20	60—64	2·00
105—109	11·50	55—59	1·50
100—104	10·00	50—54	1·25
95— 99	8·60	45—49	1·00
90— 94	7·20	40—44	0·75

Herring. 10,500 herring from different parts of the coast were examined in different ways, i. e., the stage of maturity, length, intestine-fat and weight being secured of the greatest part of the material. Vertebrae countings were carried out in 4,300 herring and 4,400 age-readings were made. The mean number of vertebrae was found to be:—

Spring spawners, N. + E.-coast	57,056
Spring spawners, SW. + S.-coast	57,160
Summer spawners, SW. + S.-coast	57,017

In the spring-spawning herring off the N. and E.-coast the average number of vertebrae decreased from west to east, viz., as follows:—

Off the western part of the N.-coast	57,086
Off the eastern part of the N.-coast	57,043
Off the E.-coast	57,038

The dominating year-classes were:— off the S. and SW.-coast: the broods of 1933, 1934, and 1935, amounting to more than 66 % of the stock, the average age being 5,6 years; off the N.-coast: the broods of 1929, 1924, 1925, and 1926, amounting to 40—50 % of the catches that were composed of about 20 age-groups in all; and off the E.-coast: 8 and 9-year-old herring were predominating. The average age of the herring from the N.-coast was 12,6 years for the western part, 12·0 years for the eastern part, and 9·6 years for the E.-coast.

Haddock. 14,200 haddock were measured, and to a great extent also age-determined by means of the otoliths. In the commercial net-catches from the Westmanna Islands during the spring 8 and 7-year-old fish were predominating (about 70 %), especially the former (the 1931-brood, viz., 42·1 %). This also was the case with the trawl-catches from "Selvogsbanki" (S.) during March and April. On the other hand the trawl-catches taken off the SW.-coast were mainly composed of younger fish, especially the 1936-brood (3-year-old haddock), which amounted to about 70 % of the total.

Saithe. 4,550 specimens were age-analysed by means of the otoliths. The main results were as follows:— in the trawl and net-catches in the warm-

water area during the spring 8 and 11-year-old fish were predominating, amounting to about 20 % and 15 % of the catches respectively. In the trawl-catches from the cold-water area 6-year-old fish were predominating (57 %) during the spring and 4-year-old fish (83 %) during the autumn. Catches of small saithe in Hafnarfjord (SW.) in December were almost entirely composed of one-year-old fish (1938-brood = 99·3 %).

Halibut. 2,450 specimens were measured and more than 1,050 age analyses carried out. In the trawl-catches off the SW.-coast more than 80 % belonged to the III-group and only 1 % was found to be older than 5 years. In the long-line catches off the NW.-coast more than 90 % were 3-year-old fish and the greatest part of the remainder were 4 years old.

Plaice. More than 12,000 fish were measured and from a large part of that number otoliths were taken for later age-readings. More than 1,000 have already been treated, and have showed that some 55 % of the catches from the SW.-coast belonged to 4-year-old fish while 25 % were 5 years old.

Salmon and **Trout.** Some 1,000 scale-samples were collected for later examination and the investigations on the "murta" in the Þingvalla lake were continued.

Plankton. About 2,000 herring stomachs were investigated qualitatively as well as quantitatively. As in previous years the relation between the quantity of food found in the stomachs, in cm³., and the yield of the fishing by purse-seine off the N.-coast during the summer agreed well, viz.:—

	July 1—10	11—20	21—31
Quantity of food, cm³...	14·2	10·2	7·1
Total catch, Hl.....	148	412	161

	August 1—10	11—20	21—31
Quantity of food, cm³...	4·4	3·8	6·6
Total catch, Hl.....	110	118	315

More than 600 hauls were taken with the Hardy Plankton Indicator, the mean duration of the hauls being 10 naut. miles. In the period from about July 20th to August 20th the yield of the herring fishery was bad owing to a small number of copepods in the surface water, most likely due to abnormally high temperatures. Thus, at the beginning of August we found the number of *Calanus* taken with the Plankton Indicator to be reverse to the surface temperature, as demonstrated in Fig. 3.

Several other investigations were carried out, e. g., measurements of different fish, temperature observations, vertical plankton hauls (113), analyses of long-line catches according to species of fish, compilation of data concerning yield of fish per unit of gear on different fishing grounds and in different years, etc.

Norway. (O. Sund).

The routine thermograph operations were continued.

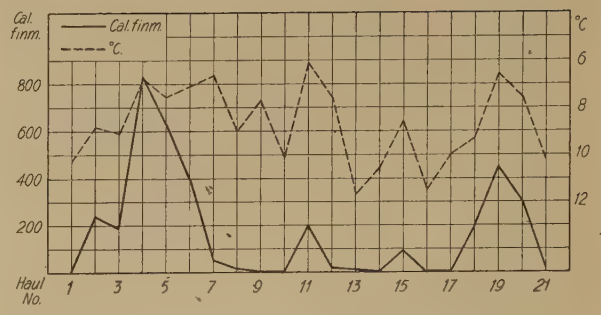

Fig. 3. Correlation between the Surface Temperature and the Number of *Calanus finmarchicus* taken with the Hardy Plankton Indicator per 10 N. miles, off the north coast of Iceland, July 1939.

Scotland. (R. S. Clark).

Once again, in June, the "Explorer" carried out a comprehensive survey of the Faroe-Shetland Channel and of the waters round the Faroes. A double crossing was effected from Flugga to Nolsø and from Suderø to Faroe Bank and thence to the Butt of Lewis just south of the Wyville-Thomson ridge.

The **sea temperatures** on the southern line of stations were higher by 1° C. than in the corresponding period in 1938, but from 0·5° to 1·5°C. lower on the northern line between Flugga and Nolsø. These observations indicate a southerly extension of sub-arctic water and a "damming" back of the warmer oceanic water. **Surface drift bottles** liberated within the Channel were recovered mostly on the northern Norwegian coast, but many liberations between Faroe Bank and the Butt of Lewis were stranded at the Orkneys and the Shetlands, indicating an indirect route via the Northern North Sea to northern Norwegian shores.

As expected, different **plankton** communities were encountered in the area. The boreal water mass contained rich oily *Calanus*, *Eukrohnia* and *Euchaeta*, while the warm tongue gave *Doliolum tritonis*, disintegrating Salps (possibly *S. asymmetrica*), larval *Paralepis*, *Fierasfer* and Scopelids. *Limacina* and *Sagitta elegans* occurred in abundance in the mixed water on the plateau from the Minch to the Shetlands. Along the eastern margin of the Channel, a narrow band of *Doliolum gegenbauri* (*sensu stricto*) and *Agalmopsis* extended to the north of the Shetlands. Oceanic *Medusae*, including *Laodicea*, *Sarsia*, *Staurophora* and *Halopsis*, dominated the waters round the Faroes, but the eastern side of the islands gave a mixed boreal-oceanic plankton, *Calanus hyperboreus* being encountered off Syderø. **Herring larvae** were again secured to the east of the Faroes, but the actual numbers were very small.

The trawl survey of the Faroes and Faroe Bank gave the usual fish species, but the actual catches were small, with the exception of **haddock** which averaged about 220 at the Faroes and 190 on Faroe

Bank for a unit haul of one hour's duration. The 1938-brood predominated at the Faroes (> 80 %) and the 1937-brood on Faroe Bank (> 90 %). These differences are striking and may be significant, though the sampling on Faroe Bank was limited to two unit hauls. Small **halibut** were taken in moderate numbers and some between 30 and 40 cm. in length were marked and liberated. A few of these have already been recaptured approximately at the position of liberation. A few very small sizes of 15 and 16 cm. were retained in the small-meshed cod-end.

Cod were scarce everywhere and only a few were marked and liberated on Faroe Bank. **Lemon Soles** were never numerous, but fair numbers were taken off Nolsø and east of Suderø. The 1934-brood predominated, while the 1927 and 1930-broods still maintained a good percentage of the older year-classes.

Sebastes occurred fairly frequently on Faroese grounds.

Whiting, as to be expected in a more southern species, were poorly represented in the catches. *Gadus poutassou* and *G. esmarkii* were taken in abundance in the small-meshed cod-end, the former species being more abundant on the west and south of the Faroes and the latter on the east side of the islands.

Sweden. (K. A. Andersson).

No work has been carried out in the area during 1939.

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ATLANTIC SLOPE COMMITTEE

1939.

Éire. (G. P. Farran).

Plankton and **hydrographic** observations made on two cruises of the ss. "Muirchu", on the north coast of Ireland on February 28th—March 3rd, 1939, and on the SW. coast on April 17th—21st. The April cruise was directed especially to the obtaining of data for plotting the spawning grounds of the **mackerel** by means of hauls with the 2-m. stramin net.

Routine examinations of samples of **herring** from the various fishing grounds were made.

England. (F. M. Davis).

Up to the outbreak of hostilities the usual estimations of the strength of the year-classes of the **hake** were carried out. Further work was also carried out on the **pilchard.**

Portugal. (A. Ramalho).

Observations océanographiques entreprises par l'"Albacora".

Sorties et observations océanographiques pendant les mois de Janvier, Mars, Juin, Juillet, Août, Octobre et Novembre, dans la région voisine de la côte, entre le Cap Roca—38°46′ N.—et Sines—37°58′ N.—Stations No. 1,001 à 1,275. Les résultats numériques de ces recherches sont en voie de publication.

Sont aussi en voie de publication (sous presse) les résultats des observations faites au cours d'une croisière de l'"Albacora" (du 16 Juin au 6 Août 1930) en collaboration avec le "Armauer Hansen" (Prof. B. Helland-Hansen), comprenant les Stations No. 289 à 341.

COMBINED NORTH SEA AND EASTERN CHANNEL COMMITTEE

1939.

England. (F. M. Davis).

(See report of the Southern North Sea Committee).

Germany. (W. Schnakenbeck).

Herring. In addition to the ordinary investigations in the northern North Sea and the young-herring investigations in the south-eastern North Sea a general treatment has been started of the day-books, kept now for 12 years, which record the catches of the drift-net herring-fishery. One part of this work has been finished: that illustrating the run of the fishery during the period of investigation; the work on more detailed study has been commenced.

NORTHERN NORTH SEA COMMITTEE

1939.

Éire. (G. P. Farran).

No work carried out in 1939.

England. (F. M. Davis).

No work has been done in this area during 1939.

Germany.

General. (A. Bückmann).

The statistical work and the survey of landings from the Northern North Sea have been continued.

Herring. (W. Schnakenbeck).

The special herring investigations have been continued for the purpose of eliminating the existing uncertainties in racial determination by the methods employed. These uncertainties are chiefly due to the fact that race determinations can only be made collectively and not individually. Unless it is possible to determine the race of the single specimen certain questions of practical importance cannot be answered. To reach this goal, a thorough study of statoliths has been undertaken, particularly as to their construction; in addition, countable and measurable criteria were studied: vertebrae, keeled scales, length in mm., weight and volume of gonads, diameter of eggs. The different values have been compiled in specially combined tables for comparison.

To complete the investigations in the laboratories, three cruises on board fishing vessels to the Northern North Sea were arranged. The purpose of these cruises was, on the spot, to follow the herring-fishery, its quantity and composition at the different fishing grounds and as to period and duration of fishing, combined with certain outer conditions.

Sweden. (A. Molander).

Between June 16th and July 6th the R/V "Skagerak" was commissioned for work within the waters west of the Hebrides and in the neighbourhood of the Shetland islands for purpose of investigating the distribution of the stock of **ling**. The season was chosen to correspond with that of the usual Swedish line-fishery for ling in these waters. A considerable part of the measurements and otoliths collected was obtained from the Swedish fishing-vessels with which contact was constantly kept; experts went on board to investigate the catch.—The opportunity was used to make hydrographical measurements and to make a series of hauls of various kinds.—The material collected is at present subject to investigation.

SOUTHERN NORTH SEA COMMITTEE

1939.

By

A. Bückmann.

The investigations within the area of the Southern North Sea were carried out according to the programme of the Committee (see Rapp. et Proc.-Verb. Vol. XCIV, 1, 1935, pp. 28/29 and Vol. CIX, 1, 1939, p. 40) until the outbreak of the war. As the results of the various periodical investigations henceforth will be discussed in the "Annales Biologiques" the present report gives an account only as to the way in which the programme was carried out and what essential changes—if any—took place.

A. WORK AT SEA.

Denmark. The current measurements and the collection of fish eggs and larvae were carried out according to programme from the L.V. "Horns Rev" from January to April. Furthermore, the fishery experiments from the motor boat off the Jutland coast and from the "Biologen" in the Limfjord were effected, the work planned to be made by the "Dana" during September, however, had to be given up.

England. Up to the commencement of hostilities, the work of the Lowestoft Laboratory has been carried out as in past years from research vessels, lightships and steamships. The "George Bligh" and the "Onaway" were in commission up to the time of the commencement of hostilities.

France. No report received.

Germany. The May/June cruise of the "Makrele" into the German Bight for an investigation of the stocks of commercial fishes, fish eggs and larvae and plankton as well as the work off Helgoland during July and September was carried out. In the autumn, new work has been taken up for the purpose of studying the effect of the changes inflicted on the fishery by the war. The investigations planned to take place on fish eggs and larvae, plankton and hydrography had to be abandoned.

Holland. No report received.

Scotland. The "Explorer" entered the northern section of the area in April and operated along a line of stations from Egersund to the Great Fisher Bank, the Tail end of the Dogger Bank and thence westwards to the Northumbrian coast. A shorter loop of stations covered the southern end of the Gut.

B. FISHERY INVESTIGATIONS.

I. **General.** The investigations of market landings have been continued (measurements, age determinations, partly in conjunction with special statistics); they were carried out by Denmark, at Esbjerg, by England, at Grimsby and Lowestoft, and by Germany, in Hamburg and at Wesermünde, and occasionally also at Cuxhaven.

A notable addition to the work is the institution of large scale marking experiments in England with a view to getting data on the intensity of fishing.

II. **Cod and Haddock.** While the investigations generally were carried out as usual (i. a., the Scottish survey of the stock of haddock), Germany started an intensive examination of the stock of cod in order to follow also here the influence of the war changes.

III. **Herring.** The following changes in the programme should be mentioned:— Germany (Reichsanstalt für Fischerei, Institut für See- und Küstenfischerei, Hamburg—Altona), the investigations into the herring of the Elbe have been resumed, starting in working up the material formerly collected on changes in length composition during a fishing period and on growth of otoliths. Work on herring larvae was not effected, but the results from former investigations have been prepared for the press.

IV. **Plaice.** The Danish experiments on transplantation to the Dogger Bank, planned to take place in September, could not be effected, but the inshore investigations into the density of the 0-group of plaice along the coast of Jutland have been realized.

The German work also on the stock of plaice in the German Bight and on the plaice landings of German high sea cutters could be carried out according to programme. The working up of results of Scottish transplantation experiments continues.

C. OTHER WORK.

No mention need be made as to any essential changes in the benthos and hydrographic work. Similarly, plankton research was carried out normally until the outbreak of the war. A special investigation into the plankton of the area off the Norderney Seagut was effected by co-operation between the "Biologische Anstalt, Helgoland", and the Norderney Laboratory of the "Wasserbauamt Norden", for purpose of following the transport of water masses when the tide leaves the waddensea. Since the water masses of the open sea, of the transitional zone, and of the inner waddensea are biologically well characterized, good results may be expected.

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TRANSITION AREA COMMITTEE

1939.

By

H. Blegvad.

Denmark.

Biology. (H. Blegvad).

The vessels used for the research work in 1939 were the S/S "Biologen" and the motor-boat "Havkatten"; owing to the outbreak of the war the research work from the "Biologen" had to be put off at the beginning of September.

Plaice. The Johansen young-plaice trawl was used along the coasts during the summer from the motor-boat "Havkatten". Along the coast of the North Sea and the Skagerak the catches of the 0-group were somewhat above normal, in the northern Kattegat, however, $^2/_3$ of the normal catch only, and in the southern Kattegat, the Belts, the Sound and the western Baltic the quantity was considerably below normal (see Figs. 1 and 2).

Fishing experiments with the "Eel-Tog" (a small-meshed otter-trawl) were carried out in the southern Kattegat and the Belt Sea but not—owing to the existing conditions—in the northern Kattegat. In the south-western part of the Kattegat the stock of young plaice (I and II-group) was somewhat larger than in the years 1938 and 1937, but considerably less than prior to 1937. In the Belt Sea the stock of the I-group was on the whole somewhat better than in the nearest preceding years, in some places, e. g., Smaalandshavet and parts of the northern Belt Sea, the I-group stock was more dense than has been the case for a long series of years. This is in good accordance with the fact that the year 1938 yielded a rich 0-group in these waters. Also the II-group (year-class 1937) was fairly well represented though not so rich as the I-group. Of the older age-groups only comparatively few specimens were caught. Towards the end of the year the commercial catches were composed mainly of individuals belonging to the year-classes 1937 and 1938. The stock of older (III-group and onwards) and larger plaice in the southern part of the Transition Area is very small only; the commercial fishery, therefore, is based on the young age-groups (the I and especially the II-group). In the Sound only where the fishing by otter-seine is prohibited, is found a fairly good stock of older and larger plaice.

In the autumn of 1939, catches from the commercial fishery round Læsø in the northern Kattegat were examined; the catches were mainly composed of individuals of the II-group, this age-group making up 62 % of the total number of specimens caught; in 1938 the II-group numbered in the same area no less than 71 % of the total catch. Thus the fishery on the shallow grounds in the northern Kattegat is based mainly on the young plaice (the II-group). The results of the age analyses of the individuals are given below together with the analyses from the same area in the autumn of 1938; the age-group is given in brackets:—

Year-class.	1938	1937	1936	1935	Total
Year 1938	—	28(I)	253(II)	38(III)	319
Year 1939	133(I)	240(II)	14(III)	—	387

The transplantations of undersized plaice from the North Sea were continued during the end of March and the first half of April 1939; 206,500 kg., or about 2,160,000 individuals (i. e., slightly more than in 1938) were transplanted from the Horns Rev area to the Belt Sea, the southern Kattegat, the Sound, and the western Baltic. From the coastal area of the North Sea off Thyborøn and from the Nissum Broad, 137,500 kg., or about 1,400,000 individuals (nearly the same quantity as in 1938) were transplanted to the inner broads of the Limfjord.

The results of the two transplantations were satisfactory. The percentage of marked plaice recovered from the Belt Sea transplantation during the first 9 months (only marketable fish considered) was 10 or slightly less than in 1937 and 1938, but much

better than in 1936. During the period October 1939 to January 1940 analyses of commercial catches from the Belt Sea etc. have been undertaken; in these catches the transplanted plaice averaged some 20 % of the weight or somewhat less than in 1938 (34 %) but more than in 1936 and 1937 (9—18 %). The value of the transplanted plaice caught by the fishermen, however, is larger than indicated by these percentages, because the transplanted plaice are among the largest and best paid fish in the catches, as it appears from the following survey showing the percentages of transplanted plaice among the different size-groups of plaice in catches from October—December, 1939:—

cm.....	25—29	30—35	>35
%.....	1	18	43

A considerable part of the transplanted plaice of more than 35 cm. length dates from the transplantation of the previous year (1938).

Flounder. The number of larvae caught in spring in the Belt Sea and the southern Kattegat was somewhat larger than in the two previous years; the stock of young flounder, I and II-group, was, however, a little less than in the years 1937 and 1938. Racial investigations (countings of vertebrae and fin rays) have been carried out in the western Kattegat and in the Limfjord.

Dab. The quantity of larvae caught in spring in the ring-trawl was, in the southern Transition Area, a little below the figures for the years 1937 and 1938. Taken as a whole the stock of dab was, however, nearly as numerous as in the preceding years.

Long Rough Dab. The number of larvae was on the whole larger than in 1938. A relatively large number of larvae was found as far south as in the western Baltic. In the southern Belt Sea as well as in the western Baltic a rather large stock of the II-group was found. In the western Baltic the II-group was the only age-group represented in the eel-tog catches; in the northern Belt Sea, however, a few specimens of the I and III-groups were observed too.

Cod. The number of cod larvae was below normal in the Kattegat, the Sound, and the Belt Sea, and in the western Baltic about normal. In accordance with this the number of cod of the 0-group caught in the eel-tog during the summer was but small, and considerably below that of the good survival year 1938. The I-group (the rich year-class 1938) was strong anywhere in the Transition Area, also the II-group was in some places fairly well represented. The number of older cod was, on the other hand, comparatively small. In the Limfjord where a strong inflow of cod of the 0-group was observed in 1938 a considerably large stock of the I-group was found throughout the year 1939. Racial investigations (countings of vertebrae and fin rays (D_2)) have been carried out especially in the Limfjord; the low number of rays in D_2 of the cod from the Limfjord seems to indicate that at any rate the main part of the cod found in the central part of the Limfjord originates from the Kattegat.

Haddock and **Whiting.** A small number of haddock larvae were observed in the Kattegat round Anholt in the spring. Whiting larvae were, however, not—as it was the case in 1938—observed in the waters south of Anholt.

Herring. Owing to the fact that the "Biologen" was not at disposal for research work after September the 1st, investigations concerning the extent of the spawning of the autumn herring in the Belt Sea and adjacent waters were not carried out.

Eel and **Mackerel.** Forecasts of the yield of the fishery have been published by Aage J. C. Jensen in "Dansk Fiskeritidende". Investigations concerning growth and sex composition of the stock of eel in various coastal waters have been undertaken.

Sprat. Racial investigations regarding the sprat have been carried out in various Danish waters.

The investigations concerning the **Norwegian Prawn** and the **Norwegian Lobster** were continued.

The **Mitten Crab** has been observed in some more localities especially along the southern and eastern coasts of the Danish islands. Young ones, however, are not recorded.

Bottom Invertebrates. As in former years, valuations of the Sea Bottom by means of the Petersen bottom sampler have been undertaken in the Limfjord and in such areas of the Belt Sea to which plaice are transplanted.

Plankton. As in previous years, vertical hauls with nets of fine gauze and with Hensen net have been made fortnightly or weekly from 3 lightships in the Kattegat and the Great Belt. Vertical hauls with Hensen net were carried out from April till August in connexion with the ring-trawl fishing.

Investigations of **Fish-Diseases** and of the **Disease** of the **Eelgrass** were continued. The extent of the disease of the eelgrass is about the same as in the preceding year.

Germany.

Biology. (Report by Dr. Kändler.)

The fishery research work carried out this year by the "Institut für Meereskunde" was specially planned to obtain data regarding the fluctuations of the stock of commercial fishes in the western Baltic. Thus, the landings of the commercial fishery were subjected to continuous control, and an extensive material on the age and length composition of fish shoals and their reproductive activity was collected from scientific trial-catches from chartered cutters and by scientists frequently accompanying commercial crafts. Collaboration with hydrographers is expected to give new ideas and new impulses. At the sprat spawning season several cruises on board the patrol vessel were made in Kiel Bay.

Plaice. The poor recruitment still continues in the western Baltic. In 1939 also, fishing with the Johansen young-plaice trawl gave very poor results (see

Fig. 1. Number of Plaice of the 0-Group (year-class 1939) taken per fishing unit in the summer of 1939. The fishing unit used was a 30-minutes haul with the Johansen young-plaice trawl.

Fig. 2. Number of Plaice of the I-Group (year-class 1938) taken per fishing unit in the summer of 1939. The fishing unit used was a 30-minutes haul with the Johansen young-plaice trawl.

Figs. 1/2); thus, in 35 hauls of total duration of 6h45′, 23 plaice of the 0-group were caught, but none of the I-group. So 1939 continues the series of poor brood-years for plaice experienced since 1936. With regard to the investigations into the young-plaice stock of the Pomeranian waters see the report of the Baltic Committee.

Flounder. In the spring many small female flounders were recorded within the Kiel Bay; these were mature at a length as low as 8 cm. This striking observation was studied more closely and it was found that 48 % of the females of the II-group were biologically mature. The corresponding percentages of the III and IV-groups were 54 and 94 respectively. At so early a maturity the productivity must be very great. Moreover, conditions in Kiel Bay in 1939 seem to have been very favourable to the development of the flounder eggs and larvae. On the research cruise, July 17th to 19th, exceptionally many flounder larvae were caught in vertical hauls by the Hensen net. The average catch from 19 stations of 20 m. depth, or more, was 22·8 larvae per m^2., the maximum 57 larvae. Consequently, we may expect an enormous density of the 1939 year-class. This, however, has to be confirmed by trawl catches.

Other Flat Fishes. The distribution and growth of the *Drepanopsetta* larvae which immigrated into the western Baltic in the spring of 1937 was closely investigated, a report by Dr. Krüger being in preparation. They were found in great numbers chiefly in the north-eastern part of Kiel Bay and in the northern part of Mecklenburg Bay, i. e., in the area of the bottom current which goes into the Baltic through the Great Belt and the Fehmarn Belt. With a small-meshed trawl (the sprat-trawl) several hundred fish per hour were repeatedly caught; with the exception of a few older specimens they all belonged to the 1937-class. Their great density is illustrated also by the fact that they outnumbered by far the flounders caught simultaneously.

It is important to note that the fish have to be opened for making exact sex determinations; unlike plaice and flounder the ovary is not visible in incident light, so that it is difficult to tell females from males. After careful separation of the sexes a very important growth difference was found. In the western Baltic the length of males lacked far behind that of the females. The growth of the 1937 year-class gave the following averages for the I and II-groups:—

	♂♂	♀♀
July 1938	8·9 cm.	9·4 cm.
March 1939	11·8 cm.	16·6 cm.
August 1939	13·9 cm.	18·2 cm.

In the summer of 1939 the females of the II-group reached lengths of up to 25 cm., the males 17 cm. only. The slower growth of males, which lasts up to the older age-groups, causes the females generally to predominate in the catches, and this predominance increases with size of meshes of the gear.

In the push-net catches, on the western side of the outer Kiel fjord, in addition to plaice and flounder, 16 little soles (solenettes, *Solea lutea* L.) were caught in August, varying in length from 2·5 to 5 cm. The catch of a larva of 7·5 mm., south of Langeland on July 19th, indicates that this species also—never yet observed in the western Baltic—has been transported into this area at the larval stage.

Whiting. In connexion with the investigations into the stock of fishes Dr. Krüger dealt with the biology of the whiting also. The stock of this species is recruited partly, if not exclusively, through larvae transported each year in varying numbers from the Kattegat. The 1937 and 1938 year-classes were recorded in great numbers in Kiel Bay. At the end of their first year of life they attain a length of 15 cm., at the end of the second one 26 cm. Older and larger fish (> 35 cm.) occurred sporadically only; they emigrate generally soon after maturity which both sexes attain at the end of their second year already. Numerous females with ripening ovaries were found, but relatively few were ripe (Stage VI) and still less spent. On the other hand, at the end of the spawning period, fairly many females were caught with unemptied ovaries the eggs of which were in a state of degeneration. Thus, it seems that those whitings which, unlike the majority, stay in the Baltic instead of emigrating in the reproduction period, are prevented from spawning by the special conditions of this area. Further investigations will have to show whether the eggs of the few fish, that actually spawn, develop normally. An artificial fertilization carried out in North Sea water on April 25th, 1939, was successful; the eggs developed normally even after having been transplanted into Baltic water of 13 ‰. Their specific weight is rather high, corresponding to that of sea water of 25 ‰. These and higher values being reached in Kiel Bay as a result of specially high ingoing currents only, conditions for the development of whiting eggs must be supposed to be generally very unfavourable. In April 1939, for instance, the salinity of the bottom water on the whiting fishing grounds in the western part of Kiel Bay was 22—23 ‰ only.

Herring. The investigations into the composition of the herring and sprat stocks in the western Baltic, started in the autumn of 1938, have been continued in the year under review and have not yet been concluded. Their object is closely to follow the growth of the brood of the spring and autumn herrings and to find the percentages of age-groups and races in the shoals and in the landings of the commercial fishery, and thus to throw light on the problem of fluctuations. We try to determine the race of young herrings from the structure of the otolith.

Sprat. The growth and age compositions of the shoals in Kiel Bay showed notable differences at the beginning and the end of 1939, as illustrated by the following two samples:—

	Length, cm.							Age-groups			Number
Date	10	11	12	13	14	15	16	I	II	III	
1·12·38	—	1	15	62	53	3	1	37	83	15	135
23·10·39	2	17	62	35	10	1	—	105	21	1	127

During the fishing season 1938/39 the sprat were older and larger than those of the season 1939/40— a clear indication that the 1937-class was less dense than the 1936-class, since normally the I-group provides the bulk of the catches. Judging from the fishery returns neither the 1938-class seems to be numerous.

Many hauls with the Hensen egg-net made in Kiel Bay during May, June and July, provide information on the egg production during 1939. At depths of 20 m. and more sprat eggs were recorded everywhere in fairly great numbers. Spawning of any intensity began in the western part, increased gradually towards the east and ceased finally in the area of Fehmarn Belt. From previous years' experience the amount of eggs spent in 1939 may be considered normal and sufficient for sustaining the stock.

(Report by Dr. FISCHER.)

Transplantation of North Sea Plaice. The transplantations of young North Sea plaice to the Baltic, executed now for some years, have been continued in the spring of 1939. The chief area of liberation was Lübeck Bay;—a good number of plaice were marked. We had reason to believe that the marking results did not give a satisfactory indication as to the yield of the transplantations to the fishery. In order to obtain more exact data we have made various analyses of plaice catches in Lübeck Bay with a view to stating the relation: North Sea plaice v. Baltic plaice in the area of liberation. Results from previous years' transplantations prove this to be possible since the transplanted plaice do not migrate and retain their habitus so that they are easily distinguished from Baltic plaice. The transplantation of large plaice ready to spawn which had been planned to take place in September and October could not be carried out.

Herring and Sprat. Investigations continued on a large scale in 1938 regarding the effect on the stocks of herring and sprat-trawling proved the advisability of discussing this problem with representatives from other nations interested in the Baltic sprat fishery, specially with a view to general measures for protection. Dr. FISCHER has written a report on this matter which was read and supported at the 32nd meeting of the International Council in Berlin.

Eel. As a result of his investigations into the ecology of the Baltic eel Dr. MEYER has published a paper, see list of literature.

Flat Fishes and Cod. (See report of the Baltic Area Committee).

Salmonids. (See report of the Salmon and Trout Committee).

Nephrops norvegicus. The collection of material has been started.

Hydrography and Plankton. (Professor H. WATTENBERG.)

On the monthly cruises organized by "Institut für Meereskunde der Universität Kiel" with the patrol vessel "Heinrich Schnoor" the hydrographic condition of Kiel Bay has been surveyed at several specially selected stations. In Kiel fjord these investigations have been carried out at still shorter intervals. Special attention was paid to the nutrient salts and their relation to the plankton production. The method used in the determination of chlorophyll in sea water was further developed by Dr. J. KREY, and the results have been co-ordinated with the quantitative investigations of micro and nannoplankton. (See the reports of the Hydrographic and the Plankton Committees.)

Sweden.

Biology. (K. A. ANDERSSON.)

The researches during the past year have been carried out to the following extent.

Haddock. The collecting of statistical reports regarding landings at the fishery-harbour of Gothenburg has been continued according to the plan of former years.

Plaice. The investigations of the occurrence of the younger year-classes of plaice at the west coast began at the end of August, but had to be broken off after a few days.

Transplantation of small plaice was carried out partly in April in the Bay of Laholm, partly in May in the Gullmar and Uddevalla-Fiords in Bohuslän. In the former area 120,000 plaice were liberated, 40,000 in the Gullmar Fiord and 75,000 in the Uddevalla Fiord.

Witch. Reports of the landings at the fishery-harbour of Gothenburg have also been collected during the year.

Sprat. The sprat investigations have been continued according to the plan of the preceding years. Numerous samples from different seasons have been collected for analysing the abundance of the various year-classes. In connexion with that, the collecting of reports of the daily extent of the sprat fishery from various localities has been continued. Like former years great attention has been paid to the question of the correlation between the sprat fishery and certain meteorological and hydrographical factors. The result thereof has been communicated partly through a lecture by Dr. MOLANDER at the meeting in Berlin, May 1939, and partly in his paper, which was ready for printing at the end of the year: A Research upon the Sprat of the West Coast of Sweden. I. (Sv. Hydrogr.-Biol. Komm. Skr. N. S., Biologi, II, Nr. 4). Several investigations of the 0-groups of sprat were carried out during the autumn 1939 in the Skärgård and the fiords of the middle Bohuslän. The 0-group appeared to be very weak.

Herring. Numerous samples of herring have been collected from different parts of the Kattegat and Skagerak for age determinations and racial studies.

Nephrops norvegicus (Norway Lobster). The investigations of the Norway lobster have been continued. A large number of trawlings with the m/s "Skagerak" have been carried out in the Skagerak and Kattegat. A vertical dislocation of the numerical

composition of the stock of the Norway lobster during different seasons has been ascertained, proving that seasonal migrations exist. Norway lobster kept in aquaria have appeared to thrive well in captivity and observations have been made concerning the vital functions of the Norway lobster, as moulting, mating, spawning and hatching.

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BALTIC AREA COMMITTEE

1939.

By

K. A. Andersson.

Denmark.

Biology. (H. Blegvad).

Fishing experiments with the eel-tog (a fine-meshed trawl) were carried out from the "Biologen" in the coastal waters east of Sjælland, Møen, and Falster in May and June; further in the Arkona Basin, the waters round Bornholm, and in the Oder Bank Area during the month of August. Fishing experiments with the ring-trawl (as well as hauls with the Hensen net and hydrographical observations) were made in the waters east of Sjælland, Møen, and Falster during May and in the waters round Bornholm towards the end of June and at the beginning of July, as well as in August. Fishing with the Johansen young plaice trawl and with the hand push net has been carried out at the east coast of Sjælland, Møen, and Falster (between Stevns and Gedser) and at the coasts of Bornholm and Rügen during August. Valuations of the sea bottom were made round Bornholm and east of Rügen during the same month.

Plaice. In the waters east of Sjælland, Møen, and Falster the number of specimens belonging to the 0-Gr. was slightly below normal (the separate observations are given on the charts Figs. 1 and 2 in the Transition Area report). In the waters around Bornholm the quantity of the 0-Gr. was somewhat lower than in 1938 and lower than it is normally the case. The mean catch per 30 minutes with the Johansen young plaice trawl was along the west coast and south coast 4·3 specimens (mean for the years 1937—39: 23·4 specimens), and along the north coast 1·0 (mean 7·5); the corresponding figures for the hand push net (1 man in 1 hour) were 0·3 (5·6) and 2·0 (18·9); the results of the various fishing experiments are shown in Fig. 1. The stock of the young plaice of the I and II-Gr. on the nursery grounds was as a whole somewhat below normal. The comparatively small numbers of the 0, I and II-groups indicate that the possibilities of a good plaice fishery in the southern Baltic in the nearest future are small only.

Flounder. In the coastal waters round Bornholm the quantity of the specimens belonging to the 0-Gr. was generally about normal; along the west coast and south coast the catch per 30 minutes with the Johansen young-plaice trawl amounted to 62·8

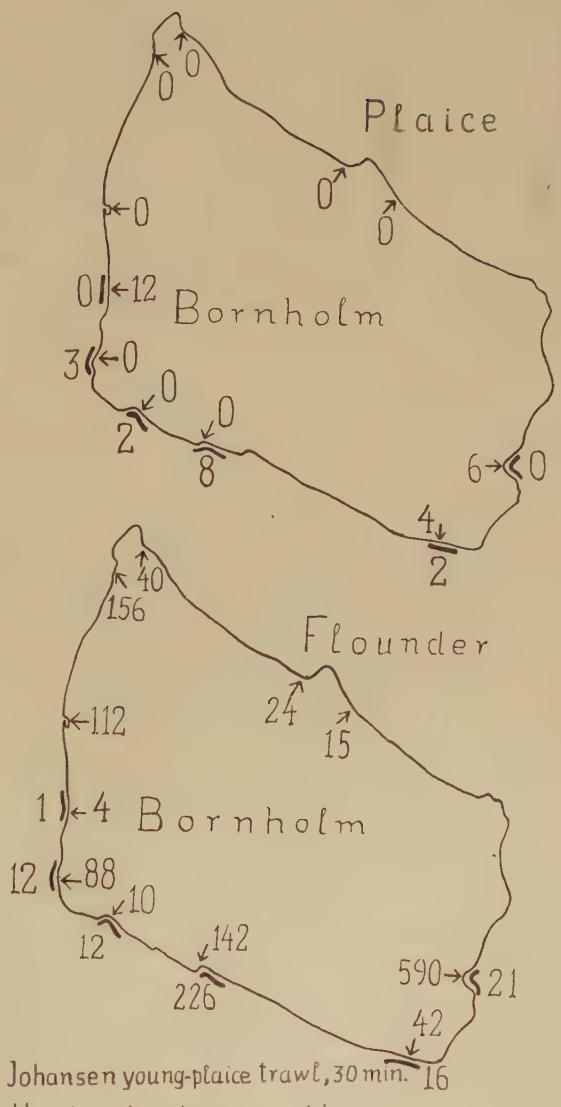

Fig. 1. Catch of Plaice and Flounder of the 0-Gr. in the coastal Waters of Bornholm.

specimens (mean 50 specimens); along the north coast and east coast 18·5 (mean 50). The corresponding figures for the hand push-net (1 man in 1 hour) were along the west coast and south coast 85·3 (149) and along the south coast and east coast 142·5 (115). The catches were but slightly smaller than in 1938 but considerably smaller than in 1937 and 1936. The catches of individuals of the 0-Gr. in the coastal waters east of Rügen were somewhat below those in 1938. In the Oder Bank area rather considerable catches of the II-Gr. were made.

Turbot. The number of turbot of the 0-Gr. was generally a little larger than in the two preceding years. A few larvae (length 6—8 mm.) were taken in the ring-trawl at the beginning of July, round Bornholm.

Dab. A number of larvae of the dab were taken in the ring-trawl round Bornholm by the beginning of July; the length amounted to 6—7 mm.

Cod. The quantity of cod of all age-groups taken together was slightly below normal in the waters round Bornholm; the I-Gr. was the most numerous one in the catches. In the waters east of Møen and Falster the mean total number of all age-groups taken together was hardly below normal; but the quantity of specimens belonging to the 0-Gr. was considerably below normal, the I-Gr., however, slightly above normal. The number of cod larvae caught in the said waters during May, 1939, was appreciably lower than in 1938 and lower than normal. A small number of larvae (length about 5 mm.) was taken at the beginning of July in the Bornholm waters. A considerable number of larvae (length 4—5 mm.) was taken near Christiansø by the beginning of August.

Herring. The commercial summer fishery for herring in the waters round Bornholm yielded catches far below normal. Investigations carried out during July and August showed that west of Bornholm about 80 % of the catches were two years old (the 1937 year-class); these herrings were, however, too small to be of any appreciable value to the fishery. Therefore the fishery was based mainly upon the older age-groups, and the scanty occurrence of these age-groups caused the poor fishery. In the waters east of Bornholm the 1937 year-class was poorly represented and the catches were composed of about 7 different year-classes of which the 8 and 9-year-old herring amounted to no less than 10 and 4 % of the total number. The poor fishery round Bornholm in the summer of 1937 was no doubt caused by the fact that between the years 1930 and 1936 relatively poor year-classes only have come forth. Investigations with the Hensen net seem to indicate that the amount of food available for the herring was rather scanty, this being obviously an additional cause of the paucity of the yield of the fishery. Racial investigations on herrings caught in the Bornholm waters were carried out.

Sprat. At the beginning of July rather considerable catches of larvae were taken in the ring-trawl south and east of Bornholm and between Adler Ground and Rügen. The mean length of the larvae was about 7 mm. (variation 4—14 mm.).

Germany. (R. Kändler).

Plaice. The annually repeated young-fish investigations in the Pomeranian waters showed in the autumn of the year under review that little brood has been produced in the Baltic proper, well agreeing with records from the western Baltic. The average 30 minutes' haul with the shrimp trawl gave—as in the poor years 1936 and 1937—two plaice of the 0-group as against 95 in 1938.

The density and distribution in the Pomeranian bight of the good year-class 1938 was studied on two cruises onboard a fishing cutter during the summer and autumn. The plaice belonging now to the I-group were caught in fairly large numbers chiefly within a zone along the coast at depths of 5—15 m., the average in October being 46 fish. A comparison with the investigations of 1930 shows that the growth-rate in the age-groups I and II has increased by 1 to 3 cm., probably due to a continued thinning out of the stock.

Flounder. Last year already we referred to the poor egg production in 1938. Consequently, the I-group occurred in small numbers only in the year under review in the Pomeranian waters, in contradistinction to the good I-group of plaice of the same year-class. This reverse relation of good and bad brood years in plaice and flounder continued in 1939: in this year the flounder brood was prolific and the plaice brood bad. The amplitude in the flounder fluctuations, however, is never very great. In the catches of October 1939 the age-groups 0-II of the flounder were recorded in a proportion to each other as 8 : 2 : 3, while the same figures for plaice were 1 : 10 : 1. Any noticeable growth increase since 1930 has not been observed in respect of the flounder.

Herring. The investigations into the spawning of spring herring in the "Bodden" of Rügen and Swinemünde Bay, which have gone on since 1936, were concluded with two cruises during June/July and by the beginning of August respectively. On the last cruise we succeeded in catching many herrings at the transitional stage as well as young ones. The net used was an altered Helgoland "Knüppelnetz" (Petersen's young-fish-trawl), the bag of which was made of fine-meshed net-yarn (3 mm. meshes) and not as usually of stramin. This gear permits a speedier fishing, and great numbers of the already agile young herring were caught. One haul in the Bodden of Greifswald gave 940 fish, in Swinemünde Bay 1300 fish.

In each of the four years of the investigations a great amount of herring eggs and larvae has been caught. The productivity of this spring herring seems to be very great and the conditions for development favourable, and consequently good catches may be expected every year.

Sweden. (K. A. Andersson).

Biological Investigations.

The motor-boat "Eystrasalt" was kept in commission for fishery investigations during the period May 9th to November 18th. The work was devoted mainly to the study of cod and herring.

Owing to the war conditions it was not possible to continue the investigations as to the distribution of the 0 and I-groups of the flounder and the plaice, carried out in each autumn during the previous years.

Cod. The investigations were carried out in the Bornholm area and along the Swedish east coast up to the Åland sea in north. The stock of cod was abundant, especially in the Bornholm area and in the Åland sea, where the fishermen had a very good fishing. In the Bornholm region the fishing experiments were made during the period: May 17th—July 19th. Throughout this period the spawning was going on in this area. The cods were measured and a great number of samples of otoliths and scales were collected for age-determination.

Herring. A great number of fishing experiments were made along the Swedish Baltic coast and samples of scales were taken from each catch for the study of age and rate of growth. The stock of herring in the Baltic was not very rich and the fishermen's catches were on the whole rather small, although they were slightly better than during the previous year. Generally the herring in the investigated samples were young. In the Botten Bay off Hudiksvall a few were more than three years old. In the Bornholm region there was a rather good fishing mainly upon 2-year-old herring with a length of about 16 cm. Older year-classes in the catches were extremely poor. This being the case the fishing cannot as a rule be abundant.

Sprat. In order to study the stock of sprat, fishing experiments were made in the Skärgård south of Stockholm.

Hydrography.

In connection with the biological investigations hydrographical observations were made at all stations.

Reports of other Committees.

HYDROGRAPHICAL COMMITTEE

1939.

By

Prof. MARTIN KNUDSEN.

Denmark. (MARTIN KNUDSEN).

North-Western Area.

During the cruise of the R/V "Dana" in this area from July 13th to August 24th 85 hydrographical stations were completed.

The four permanent sections at Iceland have been run as follows:—

Selvogr Bank: May, July.
Vestre Horn: July.
Langanes: April, August.
Kögr: May, August.

At Myggenæs (Faroes) the surface temperature has been measured daily, and once weekly a surface sample has been collected for titration.

Surface observations of temperature and salinity have been continued from liners to Iceland and Greenland.

Southern North Sea.

Hydrographical observations were carried out from the "Dana" in the Horns Rev area from July 4th to 8th.

Surface observations have been collected from the line Esbjerg—Harwich until September.

Daily observations of t° and S $^0/_{00}$ (by hydrometer) from the lightships "Horns Rev" and "Vyl" have been undertaken by the Danish Meteorological Institute until September; the lightships were then withdrawn.

Transition Area.

Observations of t° and S $^0/_{00}$ have been carried out from the "Biologen" in close connexion to the biological investigations mainly during the months of April, May, June and August.

By the Danish Meteorological Institute regular hydrographical observations have been continued. These observations comprise:—

1) daily observations of t° and S $^0/_{00}$ (by hydrometer) from 10 lightships and 17 coastal stations.
2) 4-hourly observations of the surface current at 10 lightships.

Baltic Area.

From the "Biologen" hydrographical observations (t°, S, O_2) were carried out in the waters round Bornholm from June 30th to July 6th, and from August 3rd to 12th.

In October fortnightly observations of t° and S $^0/_{00}$ at a fishing ground near Bornholm were initiated.

At Christiansø the Danish Meteorological Institute continued daily surface observations of t° and S $^0/_{00}$ (by hydrometer).

Éire. (G. P. FARRAN).

Temperature and salinity observations were made on two cruises, as follows:— north coast of Ireland, February 28th—March 3rd, 1939, 9 stations. Southwest coast of Ireland, April 17th—21st, 1939, 22 stations in connexion with mackerel investigations.

Finland. (E. PALMÉN).

In 1939, the hydrographic-chemical work of the Finnish Hydrographical Institute has been continued as far as war conditions permitted. During this last year of peace the regular yearly expedition took place from July 1st to 21st, and at a total of 69 stations complete series of observations were taken. Besides the usual observations of the water as to temperature, salinity, oxygen content, alkalinity, and p_H the optical properties of the water were investigated by means of the photo-cell method. The results of all these measurements have been published in the *Havsforskningsinstitutets Skrift*, No. 127. From July 24th to August 17th an expedition to the central parts of the Baltic was organized in collaboration with institutions in Sweden, Germany and Latvia. Its object was the study of the Baltic as a store of heat and of its currents, giving special attention to the so-called inertial currents. The Finnish data from the international expedition have been published in the *Havsforskningsinstitutets Skrift*, Nos. 128 and 131, while the scientific treatment of the data resulting from the joint current measurements will be published shortly in collaboration with the Oceanographical Institute of Göteborg. Since the outbreak of the war, September 1st, 1939, no expedition has been arranged in Finland.

The hydrographic-chemical work at the Hydrographical Institute and at the coastal stations was carried out according to programme until the outbreak of the war with Russia which caused certain

necessary reductions and changes in the work. In connexion with the peace of Moscow a great number of the coastal stations were lost; most of them have since been regained, but as yet regular work has not been fully resumed. The data collected have been worked up as usual by the Institute, but various circumstances have prevented them from being published. In consequence partly of restrictions of the staff and partly of new work having been assigned to the Institute as a result of the changed conditions, scientific work, after the outbreak of the war, could be carried out on a reduced scale only.

England. (F. M. Davis).

Up to the commencement of hostilities, hydrographical work on research vessels, lightships and steamship lines was carried out on the same lines as in the last few years.

Germany. (B. Schulz).

The hydrographic observations of 1938, from the German lightships of the North Sea and the Baltic, have been published in Vol. XIV of the series "Meereskundliche Beobachtungen" published by the "Deutsche Seewarte". In 1939, these observations have been continued as in 1938; until the outbreak of the war from all lightvessels, since then from those on stations only. The observations carried out by the "Biologische Anstalt" of Helgoland from Helgoland roadstead and in the vicinity of Helgoland, as well as surface observations from the ferry-line Sassnitz—Trelleborg, have been continued throughout the year; surface observations on the route Hamburg—New York until the end of August only.

Germany collaborated, by the "Triton", with Finland, Latvia and Sweden in investigations carried out in the Gotland Deep (synoptic current investigations). On the voyages out and back hydrographic observations, chiefly on minimum factors, were systematically collected.

The "Institut für Meereskunde" of Kiel continued the systematic hydrographic investigations in Kiel Bay. On seven cruises by the "Heinrich Schnoor" determinations of t°, S $^0/_{00}$, O_2, pH, P, Si, Nitrite, Alkalinity, and Ca were carried out at the periodic stations.

On some cruises in Kiel Bay S $^0/_{00}$ determinations were made at very short intervals between stations in order to follow the changes in the salinity distribution caused by meteorologic conditions. As these changes may occur very swiftly it was considered desirable to finish the whole cruise in the shortest possible time and thanks to the courtesy of the navy which placed a speed-boat at our disposal, the programme was carried out very quickly.

Holland. (J. van Veen).

Up till September 1939, the observations on the lightships and the investigations of the surveying vessel "Oceaan" in the North Sea and along the coast were carried on as usual.

In consequence of the outbreak of the war the lightvessels were withdrawn and the investigations of the "Oceaan" were stopped.

One of our lightships has recently been anchored again at Lat. 53°27′ N. and Long. 3°57′ E. Here the hourly observations with Carruthers' vertical log have again been commenced.

Portugal. (A. Ramalho).

Observations océanographiques enteprises par l'"Albacora".

Sorties et observations océanographiques pendant les mois de Janvier, Mars, Juin, Juillet, Août, Octobre et Novembre, dans la région voisine de la côte, entre le Cap Roca—38°46′ N.—et Sines—37°58′ N.—Stations No. 1,001 à 1,275. Les résultats numériques de ces recherches sont en voie de publication.

Sont aussi en voie de publication (sous presse) les résultats des observations faites au cours d'une croisière de l'"Albacora" (du 16 Juin au 6 Août 1930) en collaboration avec le "Armauer Hansen" (Prof. B. Helland-Hansen), comprenant les Stations No. 289 à 341.

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PLANKTON COMMITTEE

1939.

By

H. H. Gran.

Denmark. (J. P. Jespersen).

I. Home Waters.

1. The weekly collection of plankton samples, started in 1929, from three lightships in the inner Danish waters has been continued during 1939.

2. Systematic collections of plankton samples and preservation of herring stomachs from the waters round Bornholm have been prepared. It is the intention as far as possible to get an impression of the variations in the quantity and the composition of herring food in these waters in the different seasons and from year to year. In the year 1939, the herring fishery at Bornholm was exceptionally poor and therefore it is desirable in the future to be able to correlate the yield of the herring fishery with the quantity of herring food in the herring stomachs and in the free water. For that purpose investigations on the stomach contents of herring and plankton collections should be undertaken as regularly as possible in the future.

3. The examination of the quantitative phytoplankton samples, collected at the surface of Danish waters in 1935—36, has been finished and a report dealing with the yearly phytoplankton production in Danish waters is under preparation.

4. A flagellate *Prymnesium parvum* has in the last two years appeared in some of the brackish-water lakes in Denmark and caused poisoning of the fish stock. In cultures this flagellate has been studied, but here the flagellate does not produce poison.

5. Some introductory investigations on the quantity and the seasonal occurrence of the more important animal plankton organisms in the inner Danish waters have been undertaken.

6. On a cruise with the research ship "Biologen" in June investigations on the content of phosphate in the waters round Fyn (Fünen) were carried out.

II. Northern Waters.

1. The examination of phyto- and zooplankton in Icelandic waters has been continued and the material has been supplied with samples collected on the cruises of the "Dana" in the summer of 1939 in these waters.

2. The investigations on the biology and distribution of the various copepods in East Greenland waters are finished and two reports are published on this subject (see "Publications", Nos. 6 and 7).

3. A systematic account of the pelagic copepods of Iceland has been prepared and a report is in the press.

4. The rich material of zooplankton, collected on the various cruises of the research ship "Dana" in Icelandic waters, has been investigated during the previous years. A report on the variations in the quantity and composition of the plankton with special reference to the distribution of the more important organisms is under preparation.

5. A material of quantitative zoo- and phytoplankton samples, collected on the cruise of the "Dana" in May 1938, in the waters round the Faroes, has been examined and counted.

England.

Plymouth. (F. S. Russell).

Phytoplankton. Dr. H. W. Harvey has continued experimental work on the growth of phytoplankton. A method was found by which a mixed community similar in constitution to that occurring in the sea but many hundred times more dense, could be induced to grow in crude sea water *in vitro*. This led to determining various forms in which the organisms could be supplied with their nitrogen and phosphorus requirements; experiment showed that nitrogen in the form of ammonium was utilized in preference to nitrate and gave evidence that urea and uric acid could be utilized as such.

The growth of phytoplankton in crude sea water collected at intervals during the summer was usually marked by the small number of species which developed in it; no evidence was found that it was well seeded with resting spores of species which had been abundant earlier in the year. It was found that in waters collected during the summer the growth-rate was increased by the addition of cystine and of sulphide, although the latter is soon oxidized. The minimum quantity of sulphide-sulphur required to give a distinct increase in rate was some 0·1 milligrams per

litre. Addition of these accessory nutrients, which increased the rate of growth, did not influence the composition of the community or its final density, which was dependent, in these experiments, upon the quantity of available nitrogen or phosphorus compounds added to the water.

Further experiments have been made on the effect of adding traces of manganese on the growth of *Dytilum brightwelli* in sea water collected during the winter. These indicated that an increased growth-rate is only brought about when the intensity of illumination is low or the period of illumination is reduced to a few hours daily. Experiments with a mixed culture indicated that *Thalassiosira gravida* responded in the same way to manganese, while *Skeletonema costatum* was unaffected.

Mr. D. P. Wilson has been studying the tri-radiate form of *Nitzschia closterium*. This is the diatom which has been kept in constant culture since Dr. Allen started to grow it many years ago. The diatom is roughly spindle-shaped, but mixed with it there is a three-rayed form which has been known for a long time but not described. This tri-radiate organism was for long present in small numbers only, but recently is has dominated the cultures almost to the exclusion of the spindle type. As it was not known whether one type could give rise to the other, single cells of each kind were isolated. The cultures derived from these remained pure for some months but eventually cells of both forms appeared in them all.

Zooplankton. Observations on the changes in the plankton off Plymouth have been continued by Mr. F. S. Russell by means of weekly ring-trawl collections. The conditions in 1939, up to the outbreak of war, as shown by the composition of the *Sagitta* population were very similar to those of 1938, although the numbers of *Sagitta* were on the whole even lower than in that year. There were indications of a slight incursion of *elegans* water in January and February. No unusual plankton animals were seen.

Three plankton cruises have again been made this year in connexion with the mackerel investigations undertaken by Mr. G. A. Steven and Mr. P. G. Corbin. These were made off the mouth of the English Channel in March, April and June. Besides obtaining information on the distribution of the eggs and larvae of the mackerel, the distribution of both phytoplankton and zooplankton have been studied.

A report on the plankton of the upper reaches of the Bristol Channel has been published by Mr. C. B. Rees in the Plymouth Journal.

Dr. S. Kemp has been working on the collections of the pelagic Decapoda obtained by the "Discovery II" and the "Dana". Dr. Marie V. Lebour has been studying the larvae of the Pandalidae and has described the larvae of *Pandalus bonnieri*. The study of the larval stages of Polychaetes has been continued by Mr. D. P. Wilson who has paid special attention to those of the Magelonidae.

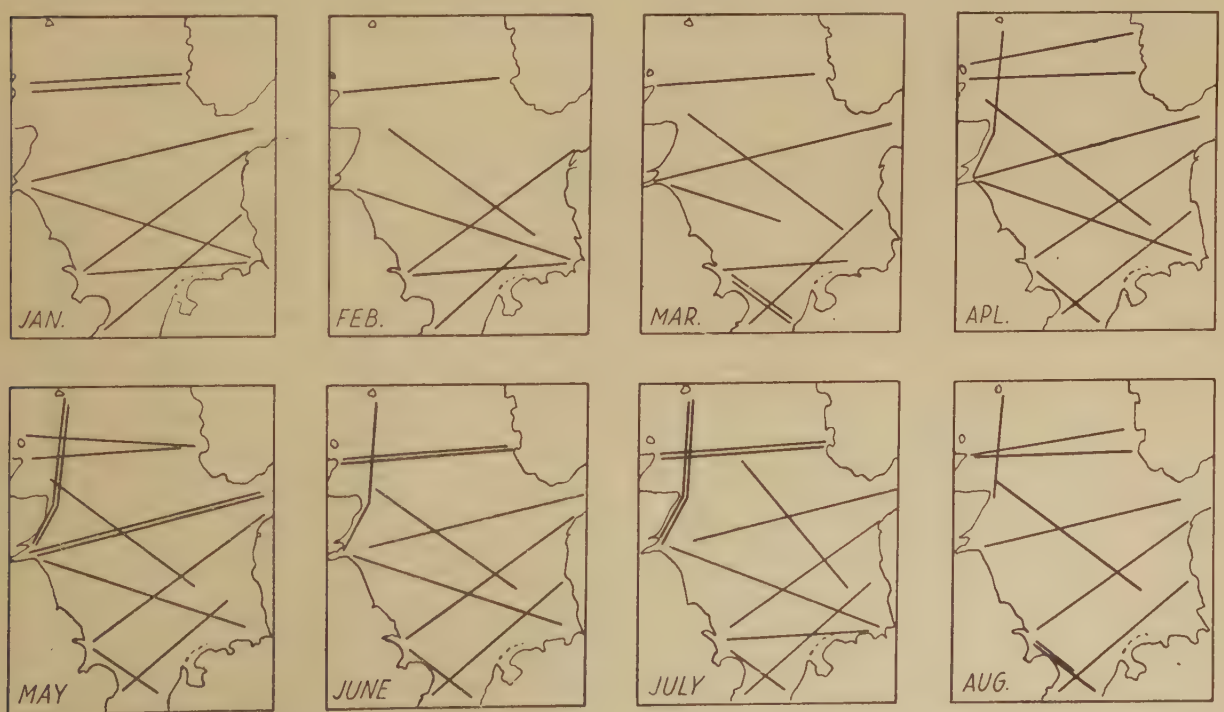

FIG. 1 PLANKTON RECORDER LINES RUN UP TO OUTBREAK OF WAR 1939 · (SEE ALSO FIG. 2)

Department of Zoology and Oceanography. University College of Hull. (A. C. HARDY).

The plankton survey of the North Sea was continued up to the outbreak of war by the use of continuous plankton recorders towed regularly across the North Sea on commercial steamship lines. The survey was operated from the two laboratories of the department: that at Hull and the sub-station at Leith (Edinburgh). The following lines were maintained:—

Hull—Skagerak	Leith—Skagerak
Hull—Bremen (or Hamb.)	Pentland Firth—Hamburg
Hull—Rotterdam	Leith—Lerwick
London—Esbjerg	Pentland Firth—Bergen
Leith—Hamburg	Pentland Firth—Faroe (Begun in April)

During the eight months (January—August) seventy-five records were taken covering a total of 20,133 miles. Details of the mileage run and the distribution of the records in time will be found in table I. The maps in Fig. 1 show the monthly distribution of the records in space with the exception of the new line begun in April towards Iceland across the Faroe-Shetland Channel. Each record has been analysed by three different specialists: for phytoplankton, copepoda, and zooplankton other than copepoda; reports on the results are being prepared for publication in the new series "Hull Bulletins of Marine Ecology".

The close observation of species indicative of Atlantic water, e. g., *Sagitta elegans*, *Limacina retroversa*, *Clione limacina* and various Euphausiacea has been continued, but the most interesting development in this direction has been the inauguration of the new line across the Faroe-Shetland Channel run on the S/S "Gulfoss" of the Iceland Shipping Company sailing between Leith and Reykjavik. This line was planned to give information on the variations of the Atlantic current before entering the North Sea. Eventually it was hoped that its continuation would enable one to link the more important changes in the North Sea plankton with earlier fluctuations in the Atlantic stream. Four records were obtained before the outbreak of war and these are sufficient to show the possibilities of a long series of observations across this important stretch of water. Fig. 2 shows the changes in the occurrence of some of the more important organisms between April 20th and July 23rd. Attention should be drawn to the presence of *Sagitta serratodentata*, *Sagitta maxima*, and *Eukrohnia hamata* in May marking an area of upwelling of deeper water at the north-western end of the line, and the region of mixed Atlantic and coastal water marked by *Sagitta elegans* and *Limacina retroversa* at the south-eastern end of the line from May to July 23rd. In July we see the main stream of the Atlantic current marked by the great patch of Doliolids in a very similar position on both July 9th and 23rd. The *Calanus* population spread along the line in May appears only at the south-eastern end in July being replaced by this great incursion of Doliolid water.

In addition to this general plankton survey experimental work has been carried out in conjunction with the Millport Marine Laboratory upon the vertical migration of the plankton.

Table I. Monthly mileage of plankton recorded on different lines in the North Sea survey for the period January to August 1939.

	Hull Skager-rak	Hull Bre-men	Hull Rotter-dam	London Es-bjerg	Leith Ham-burg	Leith Skager-rak	Pentland Ham-burg	Leith Ler-wick	Pentland Ber-gen	Pent-land Faroe
January	335	206	*	306	326	331	*	*	266	*
February	340	219	*	202	381	0	311	*	242 220	*
March	*	195	126	260	198	371	321	*	237	*
April	336	*	126 133	300	214	388	319	233	224	130
May	341	*	134	276	327	332	291	229	251 244	243 302
June	338	*	121	306	370	403 369	309	229 229	227 253	—
July	335	261	126	314	382	349	296	229 229	251 257	288
August	313	*	80 133	306	*	326	315	229 177	235 239 240	306 —
Total...	2,338	881	979	2,270	2,195	2,869	2,162	1,784	3,386	1,269

* Ships off service.

Grand Total: *20,133.*

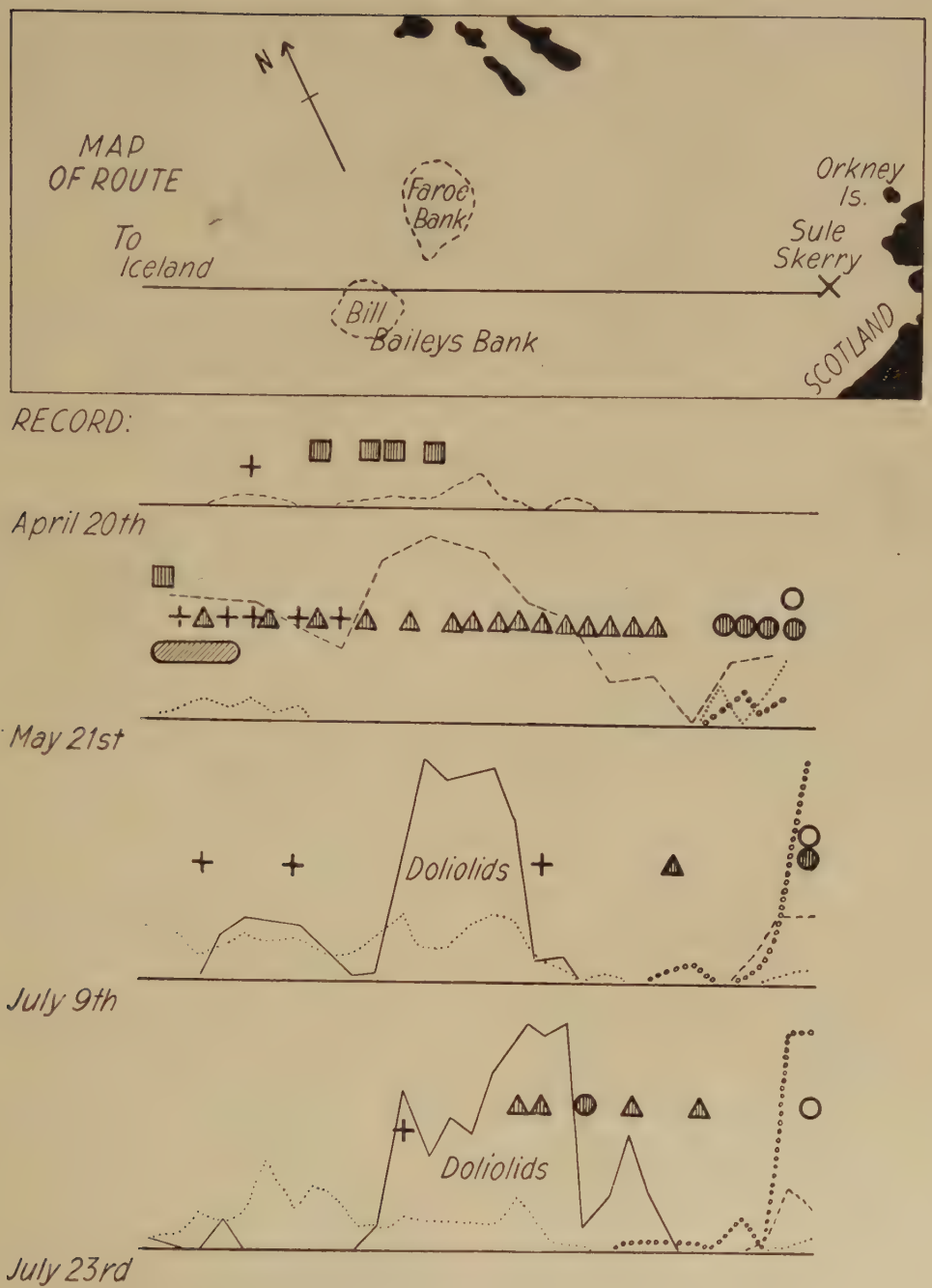

FIG. 2 RECORDS ON ICELAND LINE - 1939

---- Calanus finmarchicus
..... Dinoflagellata
..... Limacina retroversa
—— Doliolids
Sagitta serratodentata
S. maxima
Eukrohnia hamata
Metridia longa
+ Thysanoessa raschii
Thysanoessa inermis
Meganyctiphanes norvegica
Sagitta elegans

Éire. (G. P. Farran).

Plankton collections by means of vertical Nansen-net hauls were made on the north coast of Ireland on February 28th—March 3rd, 1939, and on the SW. coast on 17th—21st April, 1939.

During the April cruise oblique hauls with a 2 m.-stramin ring-net were made in conjunction with the simultaneous cruises of the English and French research steamers in order to obtain data for plotting the spawning areas of the mackerel. The hauls were made at the same positions as similar hauls in April, 1938. The material is being worked out partly in Dublin and partly at Plymouth by the courtesy of the Director of the Marine Biological Association.

Germany.

Hamburg.

In the hydro-biological department of the Zoological Institute of Hamburg the chief results of the ten years' investigations carried out in the North-Western Area have been compiled in a report (now ready for print) by Professor Hentschel "Die Planktonbevölkerung der Meere um Island". Further plankton material (sieve plankton) has been procured—and partly worked up—from Norwegian waters (O. Sund), the North Sea (K. Kraft), and the steamer route English Channel—Haiti (Drs. Thiel and Fritsch). Mr. Kraft participated in a cruise of the patrol vessel "Elbe" into the area of the Shetland Isles. The investigations on the plankton of the Baltic and on the oil-content of the copepods have been continued.

Helgoland.

The plankton work of the "Biologische Anstalt" has been continued as usual. Especially on the "Makrele" cruise during May/June, 1939, plankton was collected in the German Bight off the Dutch coast; the gear used was the Helgoland larvae net and the surface net, gauze 20. Special investigations on the surface plankton off the Norderney Sea Gut have been carried out in collaboration with the laboratory at Norderney of the "Wasserbauamt Norden". Their object was the exchange of water in the waddensea.

On the August cruise of a fishing steamer some plankton samples were taken in the area south-east of Iceland.

Hiddensee.

The plankton work of the biological laboratory was also this year concerned with the relation between the supply of nutrient salts and the production of plankton. Besides the nutrient salts of sea water those stored in mud and decomposing into minerals were considered. It was found that practically all salts, plankton organisms need for development during their period of production, were derived from mud. The intensity of production is dependent upon the supply of nutrient salts transported from the bottom to the trophogeneous layer. Since we are hardly ever able to trace these salts in the sea water it must be concluded that they are assimilated by the plankton immediately upon mineralization. Numerous mud analyses proved that mud liberates nutrient salts and we were able to recognize that phosphates heavily decrease from spring to the chief time of production and again increase until autumn when most organisms have decayed.

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1. Brandes, C. H.: Über die räumlichen und zeitlichen Unterschiede in der Zusammensetzung des Ostseeplanktons. Mitt. Hambg. Zool. Mus. Inst., Vol. 48.
2. Cooper, L. H. N.: Phosphorus, nitrogen, iron and manganese in marine zooplankton. Journ. Mar. Biol. Assoc., Vol. XXIII, pp. 387—390, 1939.
3. Harvey, H. W.: Substances controlling the growth of a diatom. Journ. Mar. Biol. Assoc., Vol. XXIII, pp. 499—520, 1939.
4. Hentschel, E.: Die Planktonarbeiten für die Deutsche Wissenschaftliche Kommission für Meeresforschung in der Hydrobiologischen Abteilung des Hamburgischen Zoologischen Museums und Instituts. Ber. D. W. K. für Meeresforschung, N. F., Vol. 9.
5. — Kinetisches und Akinetisches Plankton. Die Naturwissenschaften, Vol. 27.
6. Jespersen, P.: Investigations on the Copepod Fauna in East Greenland Waters. Medd. Grønland, Vol. 119, Nr. 9, 1939.
7. — The Zoology of East Greenland. *Copepoda*. Medd. Grønland, Vol. 121, Nr. 3, 1939.
8. Kemp, Stanley: On *Acanthephyra purpurea* and its allies (Crustacea Decapoda: Hoplophoridae). Ann. Mag. Nat. Hist., Ser. 11, Vol. IV, pp. 568—579, 1939.
9. Meschkat, A.: Untersuchungen über das Herbstplankton im Bereich des "Ostislandstroms". Internat. Rev. Hydrobiol., Vol. 38.
10. Pierce, E. Lowe and J. H. Orton: *Sagitta* as an indicator of water movements in the Irish Sea. Nature, Vol. 144, p. 784, 1939.
11. Rees, Colin B.: The plankton of the upper reaches of the Bristol Channel. Journ. Mar. Biol. Assoc., Vol. XXIII, pp. 397—425, 1939.
12. Rees, W. J.: The hydroid of the medusa *Dipurena halterata* (Forbes). Journ. Mar. Biol. Assoc., Vol. XXIII, pp. 343—346, 1939.
13. Russell, F. S.: On the nematocysts of Hydromedusae II. Journ. Mar. Biol. Assoc., Vol. XXIII, pp. 347-359, 1939.
14. — On the seasonal abundance of young fish. VI. The year 1938. Journ. Mar. Biol. Assoc., Vol. XXIII, pp. 381—386, 1939.
15. — Hydrographical and Biological conditions in the North Sea as indicated by plankton organisms. Journ. du Conseil, Vol. XIV, pp. 171—192, 1939.
16. Trahms, O.-K.: Beiträge zur Ökologie küstennaher Brackwässer. 1. Das Plankton des Grossen Jasmunder Boddens. Arch. f. Hydrobiol., Vol. 35.
17. — Zur Kenntnis der Diatomeengattung Chaetoceras. Arch. f. Protistenkunde, Vol. 92.

18/19. Two contributions to the "Meteor" publication: Thaliaceen, by H. Krüger, Appendicularien, by H. Lohmann and E. Hentschel.

SALMON AND TROUT COMMITTEE

1939.

Due to the existing disturbance in Europe no successor of the late Chairman of the Salmon and Trout Committee, Professor M. SIEDLECKI, has as yet been appointed. Under these circumstances the Administrative Secretary has compiled the contributions received as follows.

Denmark. (H. BLEGVAD).

1. Biological Investigations.

Age analyses of salmon and sea trout by scale readings have been undertaken in various water-courses. The collection of scales of salmon and sea trout and of statistics relating to the weight and length in Randers Fjord and the river Gudenaa has been continued.

Investigations in water-courses as to the amount of food available and the condition in general for fry have been continued with the object of determining the optimum amount of fry which could be liberated.

Marking experiments with sea trout and salmon have been carried out in various water-courses in Jutland.

2. Statistics for the year 1938 (from "Fiskeri-Beretning 1938", Danish Board of Fishery).

Catches in	Salmon kg.	Trout kg.
North Sea, Skagerak, and the Fjords	6,538	3,201
Limfjord	0	24,597
Kattegat and the Sound	20,287	16,188
Belt Sea	3,860	13,635
Baltic	28,645	6,666
Total...	59,330	64,287

The total amount of the catches of salmon and sea trout was slightly higher than in 1937. The catch of salmon in the Baltic proper, i. e., in the waters round Bornholm, is, however, still very poor in comparison with the catches made some years ago, as it will appear from the following statement of the yearly catch in kg.:—

Year:	1932	1933	1934	1935	1936	1937	1938
kg:	158,048	133,762	57,483	65,189	56,540	26,871	28,320

The decrease of the Bornholm salmon fishery in the years after 1934 is in good accordance with the decrease of the catch of small salmon along the Polish coast of the Baltic in the years after 1933.

The yield of the fishery round Bornholm was poor also in the winter and spring of the year 1939.

3. Artificial Propagation.

Output in 1938 (in thousands) of fry of sea trout in various water-courses leading to the

	Fry	Half-yearlings
North Sea	206	31
Skagerak	26	—
Limfjord	725	23
Kattegat	416	117
Belt Sea	401	17
Western Baltic	42	—
Baltic proper	384	—
Total...	2,200	188

The output of fry of sea trout was about 30 % lower than in 1937. In addition 30,000 very young salmon and 6,000 half-yearlings were put out in rivers leading to the North Sea and 5,000 very young salmon in the Gudenaa (to the Kattegat). The output of salmon fry was about $^1/_3$ higher than in 1937. It is to be hoped that the renewed output of salmon fry during later years can be continued and augmented in spite of the large difficulties in procuring the necessary number of female fish for breeding.

On account of the small catch of female *Coregonus lavaretus* no hatching of fry of this fish was carried out.

Éire. (A. E. J. Went).

1. Biological Investigations.

A report embodying the results of the examination of young salmon (parr and smolts) from the river Liffey has been accepted by the Royal Irish Academy for publication and a further report has been prepared on the age and growth of salmon of the river Shannon. During the year an investigation of the age and growth of salmon from the Ballisodare river was commenced. This river is exceedingly interesting because prior to the year 1853 no salmon could ascend the river owing to the existence of high waterfalls near its mouth. About 1850 the river was stocked with salmon and in a few years the river system was populated to such an extent as to afford a prolific and profitable fishery for salmon. Fish passes were erected to provide passages over the major obstructions. Although this investigation is not yet completed it is quite clear that the proportion of one-year smolts is very high (approximately 20 %). The results will be published in due course in one of the scientific journals of this country.

2. Artificial Propagation of Salmon and Trout.

Hatchery operations were greatly curtailed owing to flood conditions which prevailed throughout the 1938—39 season and the output of most hatcheries was smaller than in any year within the last decade. Altogether forty-one stations were operated during the season, twenty-four of these were stocked entirely with eyed ova obtained from some of the other hatcheries, and the remainder were wholly or partly stocked by stripping fish taken locally for this purpose. Ova from salmon were collected at eleven stations; from sea trout at three stations and from brown trout at seven stations. The aggregate number of fry distributed from all the stations was only about one-third of the figure for the 1937—38 season.

The total number of fry distributed was:—

Salmon	1,497,000
Sea trout	156,000
Brown trout	760,000
Total...	2,413,000

3. The Catch of Salmon.

Returns of the catches of salmon were demanded from every holder of a licence to fish for salmon in 1939. These returns, now in course of compilation, will not be available for some months. Each month the Department of Industry and Commerce for Éire publish details of the quantity of salmon and trout exported from this country. These figures indicate quite accurately the size of the catches since comparatively small quantities of salmon are consumed within the country. The exports in 1939 amounted to 642,400 kg. which are equivalent to nearly 60 % of the average amount annually exported for the period 1924 to 1938 both years inclusive, and were the third lowest since 1924, the first year for which records are available. The quantities exported per month, in kilogrammes were:—

January	2,300
February	26,850
March	39,050
April	65,100
May	132,700
June	213,100
July	152,000
August and September	11,300
Total...	642,400

Large and small spring fish (3 and 2 sea winters) were very scarce being generally less numerous than in the previous two years, and although the summer fish (1+ and 2+ sea winters) showed some improvement on the previous two years they were not plentiful. The rivers emptying into the sea along the west coast had, generally speaking, a better season for grilse (1+ sea winters) than the remainder of the country. The drift-net fishing (mainly for grilse) in the sea off the north and north-west coasts showed some improvement over the past few years.

4. The Marking of Kelts at several places was carried out during the spawning season. Numerous recaptures were made during the year.

5. Papers published or in the press.

(1) Salmon in Eire. A study of the runs in 1937 and 1938. Arthur E. J. Went. Salmon and Trout Magazine, March, 1939.
(2) River Liffey Survey III. The growth and food of young Salmon. W. E. Frost and Arthur E. J. Went. Proceedings of the Royal Irish Academy.

6. Legislation.

During 1939 the Legislature passed a comprehensive measure dealing mainly with the salmon and trout fisheries of this country. Apart from certain administrative matters, this piece of legislation made provision for the acquisition of certain net and weir fisheries by the State, the abolition of freshwater netting, the extension of the close season for rod fishing for salmon and trout and empowered the Minister for Agriculture who is responsible for the administration of the Fishery Laws to control the number of nets used in the public tidal fisheries. The Minister for Agriculture was also given power to prohibit the importation of any live fish or other aquatic animals.

Finland. (T. H. Järvi).

As far as fishery investigations in the bays of the Baltic are concerned the work on the salmon only has been continued during 1939 all other work having dealt with freshwater fishes.

Germany. (A. Willer).

In the year under review the work dealing with the study of salmon has been continued. Experiments have been made to explain by serological methods the racial connexions between salmon, sea trout, brown trout, and rainbow trout. As it is difficult to procure sufficient fish blood—specially from salmon—we have tried to obtain precipitating sera by treating rabbits with muscle albumen from the salmonids in question. The experiments have not yet been concluded.

Sweden. (N. Rosén).

1. Samples of salmon scales collected during previous years from the west coast (Skagerak and Kattegat) have been examined, but the examination is not yet completed. Material for scale analyses of salmon has been collected from some rivers in Norrland, as well as from Södertörn and Blekinge (Baltic).

2. Small salmon have been marked in the sea at the coast of Norrland, spent salmon in the rivers Ume älv, Indalsälven and Dalälven.

3. Earlier crossing experiments between different species of salmon and char have been continued. Eggs of salmon and sea trout are hatched.

4. Catch of salmon and sea trout, in

	1938	and in 1937
Øresund—Kattegat—Skagerak	37,667 kg.	47,000 kg.
Baltic	249,661 -	292,000 -

5. Sturgeon sold at Gothenburg, in 1939:—

	Jan.	Feb.	Mar.	Apr.	Nov.	Total
kg.	67	69	143	22	71	372
spec.	3	5	3	2	4	17